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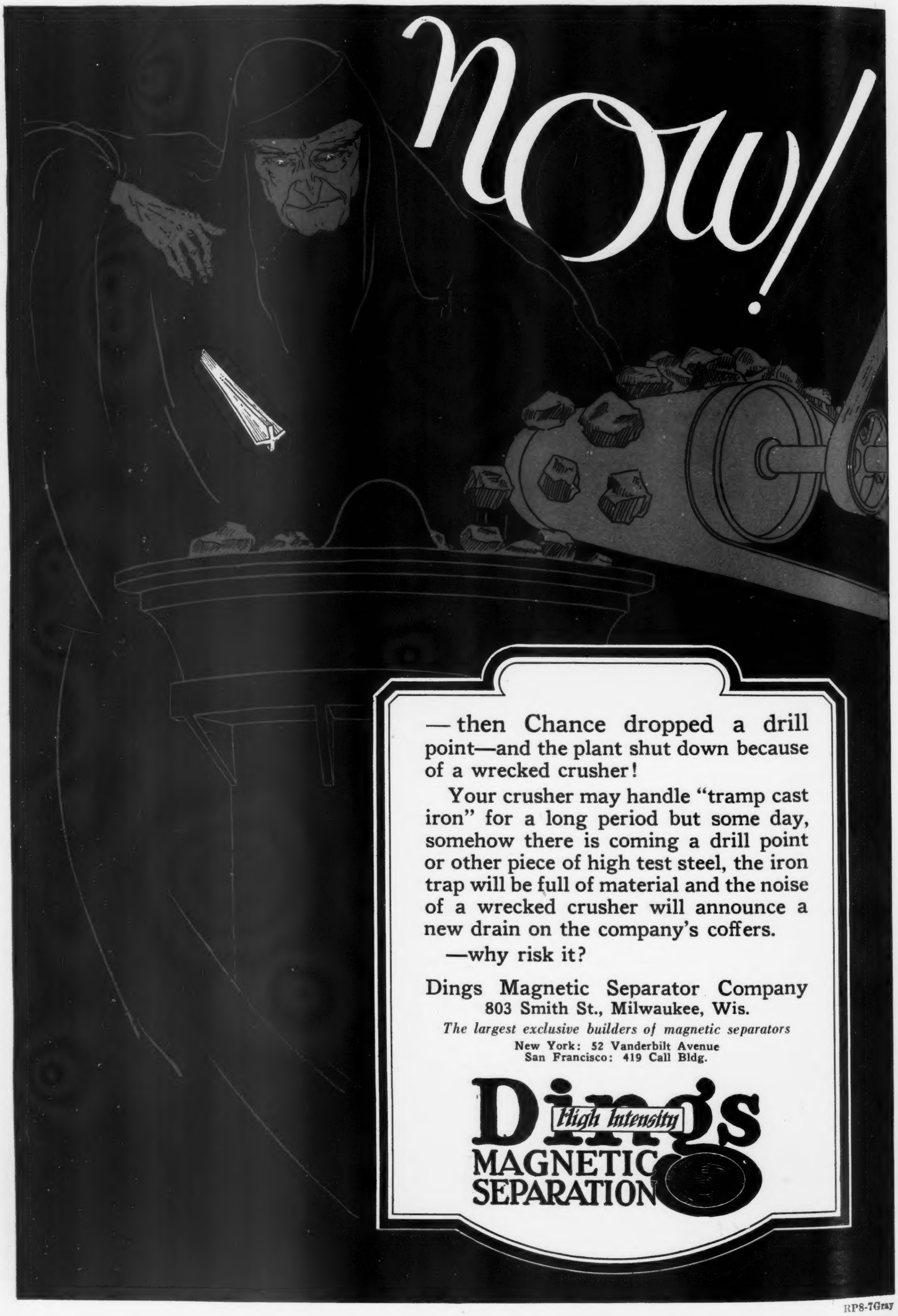
Now!
— then Chance dropped a drill point—and the plant shut down because of a wrecked crusher!
Your crusher may handle "tramp cast iron" for a long period but some day, somehow there is coming a drill point or other piece of high test steel, the iron trap will be full of material and the noise of a wrecked crusher will announce a new drain on the company's coffers.
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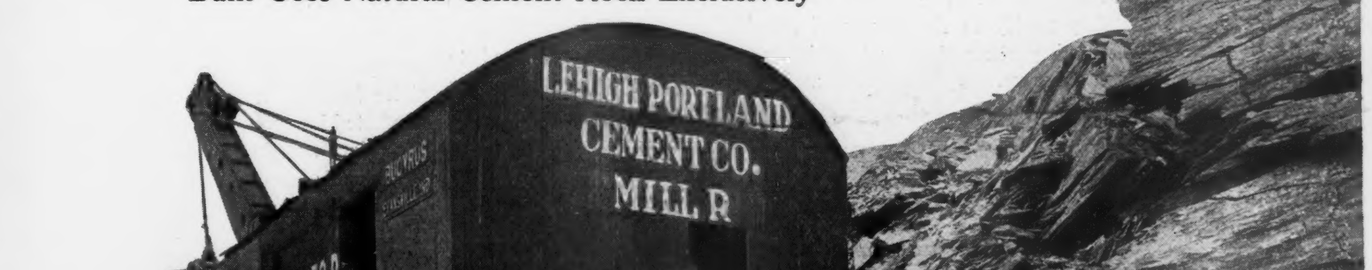
Volume XXIX Chicago, August 7, 1926 Number 16

New Sandt's Eddy Mill of the Lehigh Portland Cement Co.

One of the Finest Wet-Process Plants Yet Built Uses Natural Cement Rock Exclusively



Electric shovel in the newly opened quarry of the Sandt's Eddy (Pennsylvania) plant of the Lehigh Portland Cement Co., where natural cement rock is made into portland cement by the wet process

Electric shovel loading 8-yd. all steel cars drawn by 18-ton gasoline locomotive

THE new Sandt's Eddy (Penn.) plant of the Lehigh Portland Cement Co. is doubly interesting: It is the first wet-process plant to be erected in the Lehigh Valley, probably the most famous portland cement manufacturing district in the world; and it is unquestionably one of the cleanest and neatest new wet-process, waste-heat cement plants anywhere in the world. The views herewith will certainly testify to the truth of this statement, as they show the operation with unusual completeness.

The Quarry

The quarry is an entirely new opening in the extensive deposits of natural cement rock for which this section of Pennsylvania and New Jersey is famous. The deposit parallels the Delaware river, a few miles above Easton, Penn., where the Delaware joins the Lehigh river, and is almost within sight of Martin's Creek, where there are two mills of the Alpha Portland Cement Co.

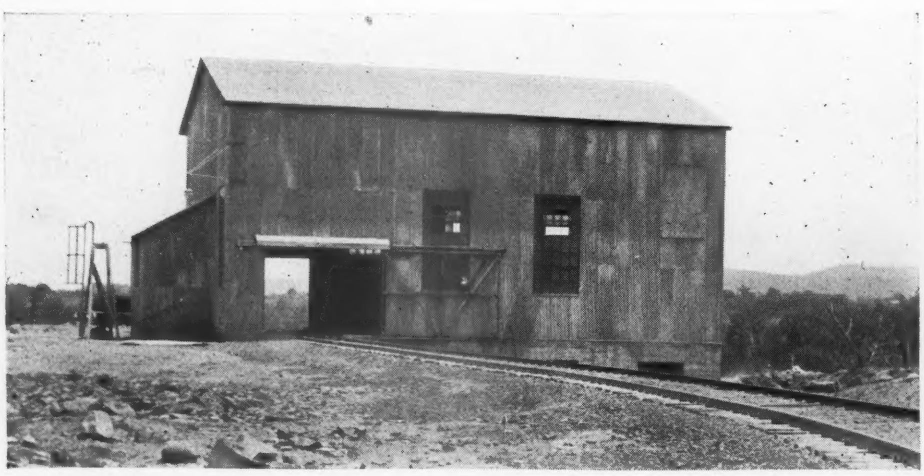
The ledge of rock has been opened to make a long, practically straight quarry face, in which two distinctive kinds of natural cement rock are quarried, a high percentage calcium rock at one end, and a lower percentage calcium rock at the other end of the face. The correct mixture for portland cement manufacture is made by proper proportioning of these two raw materials, no other ingredients being required save the usual gypsum added to the clinker in the final grinding of the finished cement.

The gasoline shovel used for stripping the quarry and two 18-ton gasoline locomotives are the only pieces of equipment about the plant not electrically driven. The other quarry operating equipment includes 2 electrically-operated 6-in. well drills and two 50-ton electric shovels with 1¾-yd. dippers. All the shovels are on caterpillar treads.

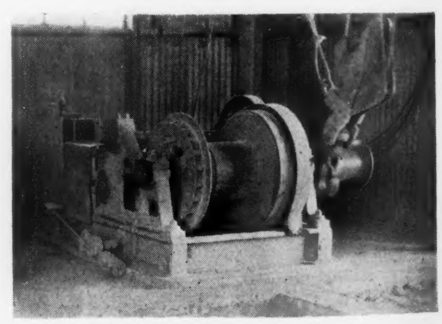
The cars used to move the rock from quarry to plant, a distance of about a half mile, are of 8-yd. capacity, all-steel, and standard gage. An 18-ton gasoline locomotive handles trains of 8 cars each, and the first proportioning of raw materials is done at the quarry in setting the correct number of cars at each shovel, the one loading high calcium and the other low calcium rock.

The engine house at the quarry has a blacksmith's forge, a drill-bit sharpening machine, engine pit, electrically driven air compressor, and a gasoline pump and gage. The building is heated by an electrically-operated low pressure overhead steam system.

Before arriving at the crusher house each trainload of rock passes under a spray pipe, where the rock is wet sufficiently to prevent dust in the primary breaker. Thereafter, there is no opportunity for dust, and the

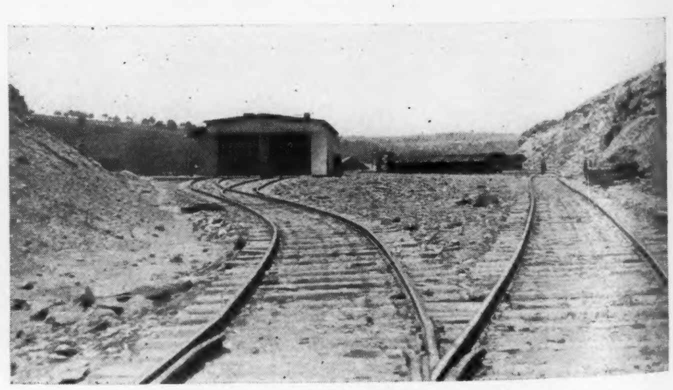


Crusher house on hill to the north of the main building



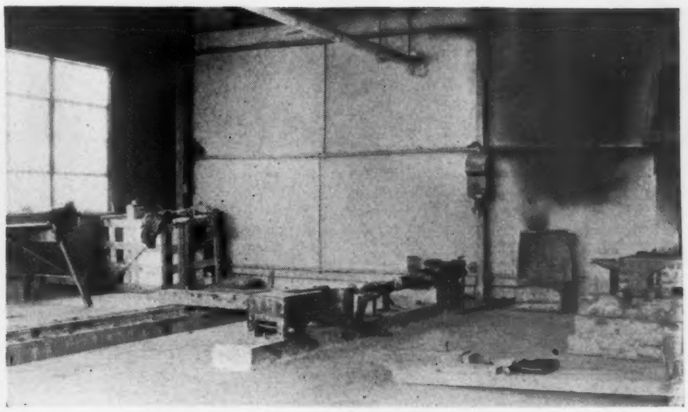
Hoist for dumping cars at crusher

Stripping shovel (gasoline) and electric well drill

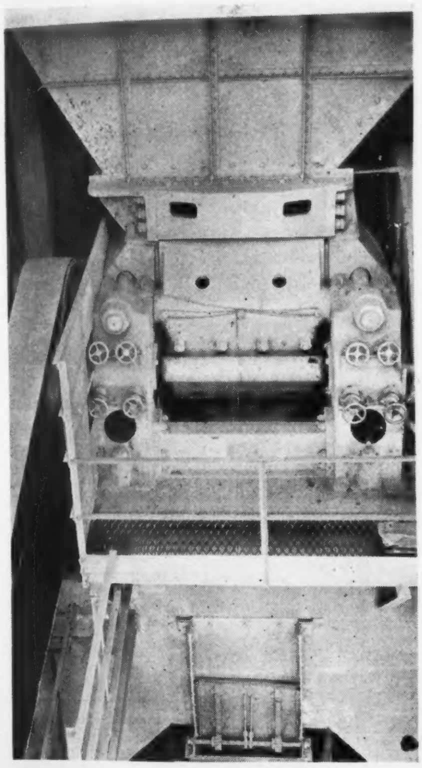


Engine house and quarry face (at right)

Engine house, showing gasoline meter for locomotives



Corner of the engine house, showing forge and drill bit sharpener



Looking down on the single-roll primary breaker

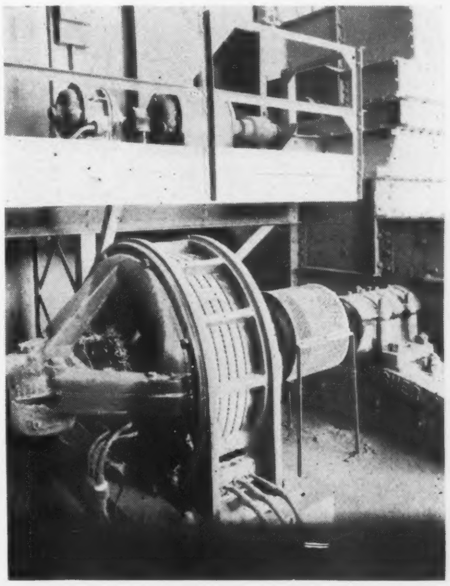
plant is as near dustproof as it is physically possible for any cement plant to be.

The Crushing Plant Is of Particular Interest

The side-dump cars are dumped by means of a small electrically operated hoist, placed in a recess in the crusher building opposite the primary breaker, which is a 36x60-in. single-roll crusher. The crusher hopper is all-steel construction; and the crushing capacity of this unit is 500 tons per hour. The crusher is belt-driven by a 200-hp., 2200-v., 585-r.p.m. electric motor, for obvious reasons, but this is the *only* belt-driven unit in the entire plant, all other drives being either direct through spur-gear type speed reducers, or through silent chains and speed reducers, as the description which follows will show.

The secondary crusher is a 300-ton per hour hammer mill, reducing at this rate to 95% through a 1¼-in. ring. This crusher is given a uniform feed from a hopper under the primary crusher by means of an all-steel apron feeder, 48-in., driven by a direct-connected 10-hp., 440-v., 860-r.p.m. motor through a 27 to 1 spur-gear speed reducer. The hammer mill is driven by a 250-hp., 2200-v., 705-r.p.m. motor direct-connected through a flexible shaft coupling.

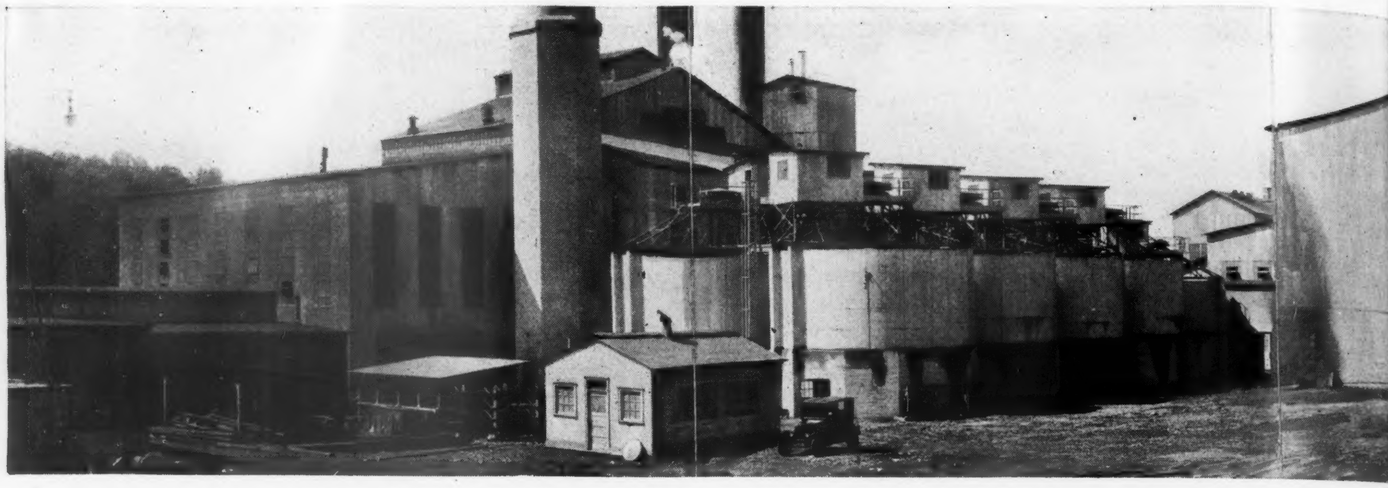
The hammer-mill discharge feeds directly to a 30-in. belt conveyor, driven direct from the lower pulley by a 50-hp., 440-v., 860-



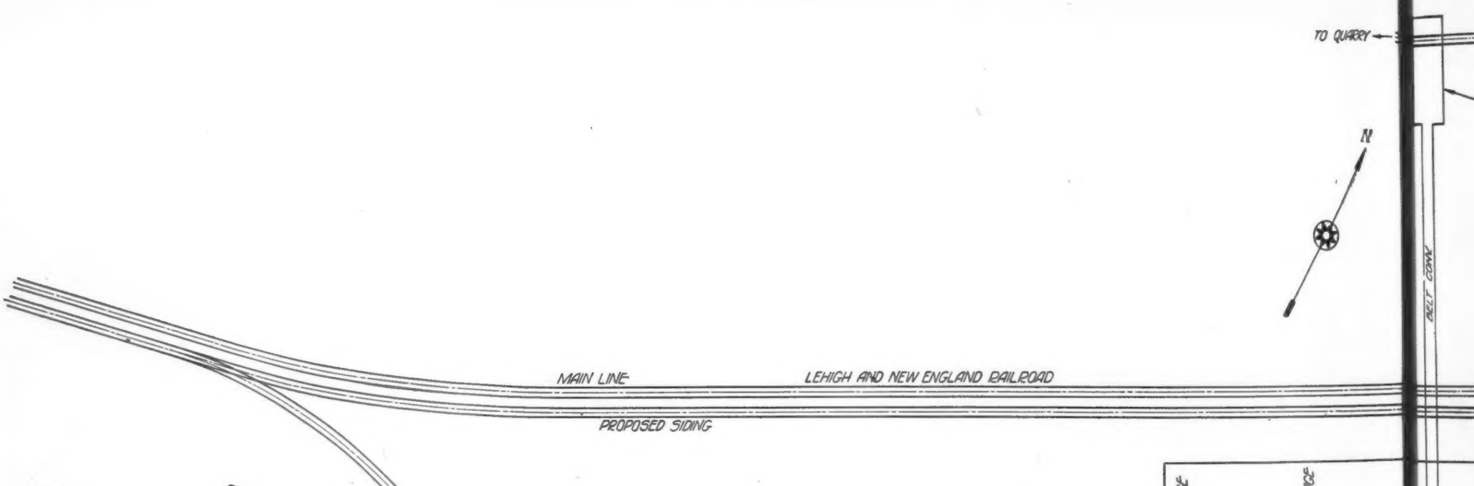
Drives on apron feeder (above) and hammer mill (below)

Interior of crushing plant, control switches at extreme left

The only belt drive in the plant, on the primary breaker

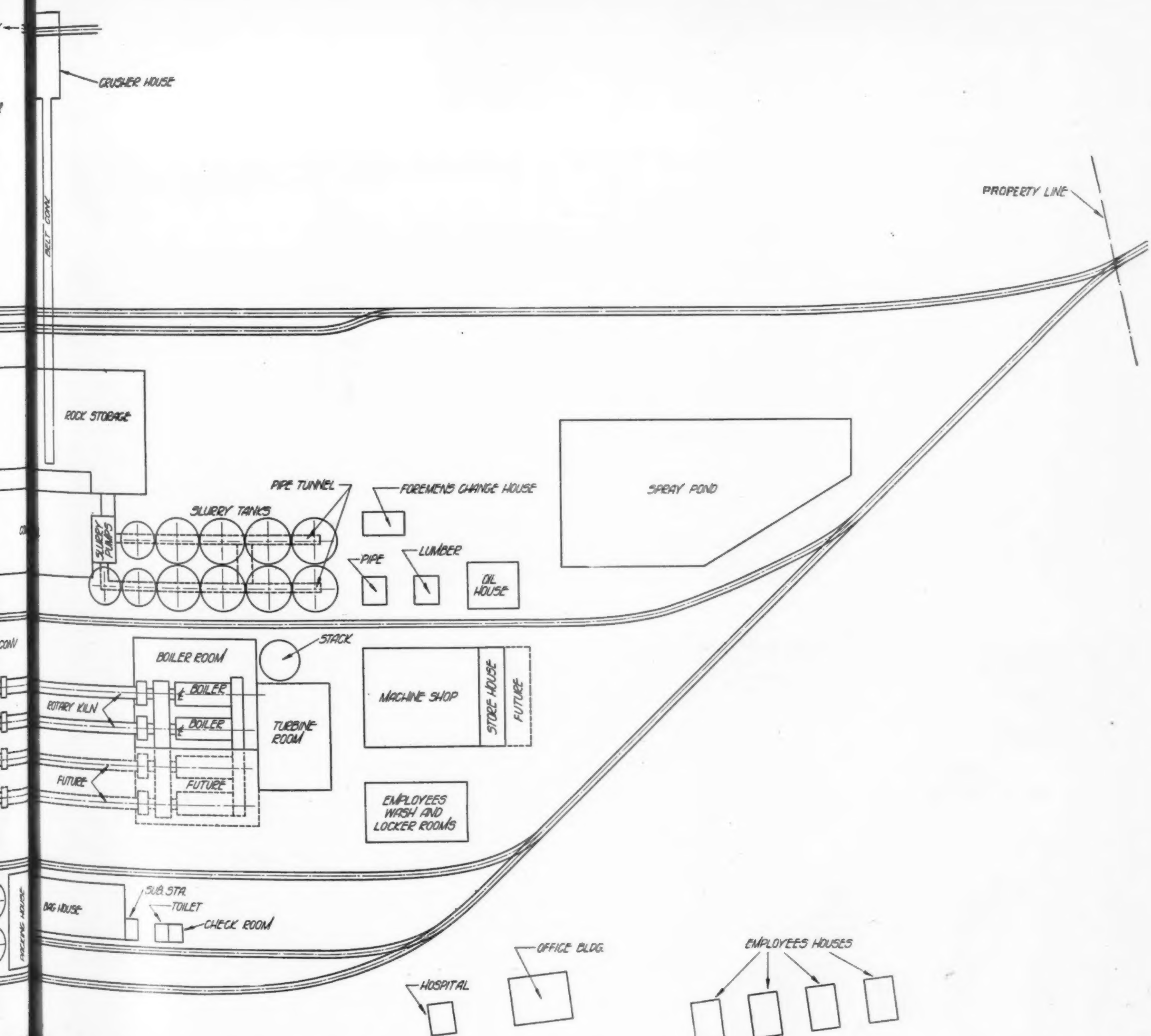


Panorama of the Sandt's Eddy plant of the Lehigh Portland Cement Co. This view is taken from the top of a box car on the
and at the

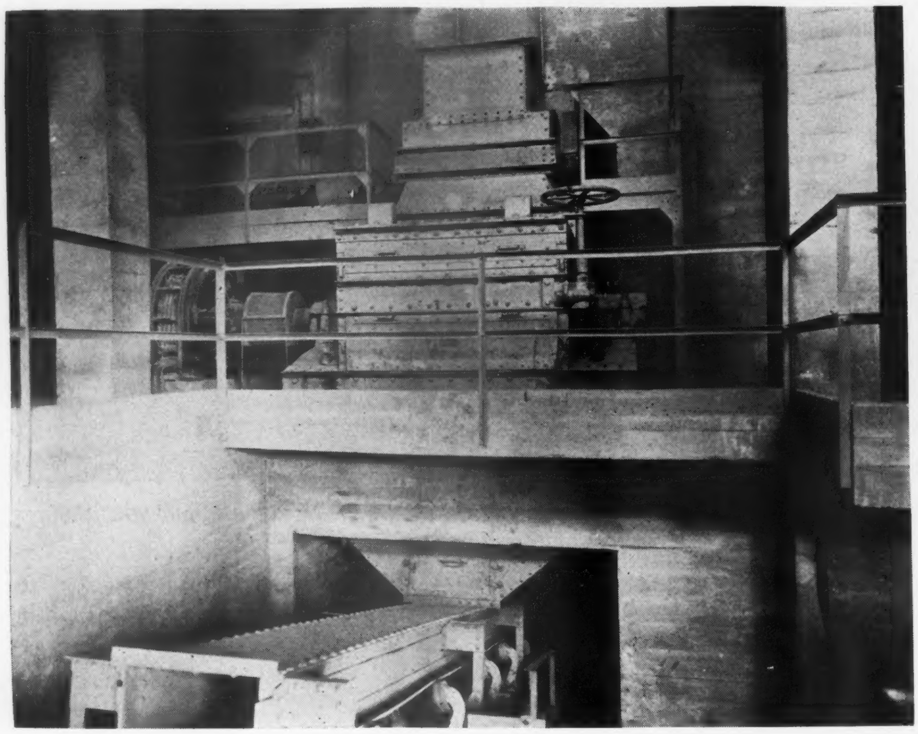


General plan of the Sandt's Eddy plant of the Lehigh Port

...most track about opposite the end of the spray pond (see plan below). The building at the extreme left is the machine shop, ...t, the crusher house



Portl...ment Co., showing location of proposed new kilns and silos



Hammer-mill secondary crusher and belt conveyor feeder

r.p.m. motor through a 27 to 1 spur-gear reducer. This conveyor is 305 ft. centers and has ball-bearing pulleys and idlers and a pressure system of lubrication which requires grease about once in three months.

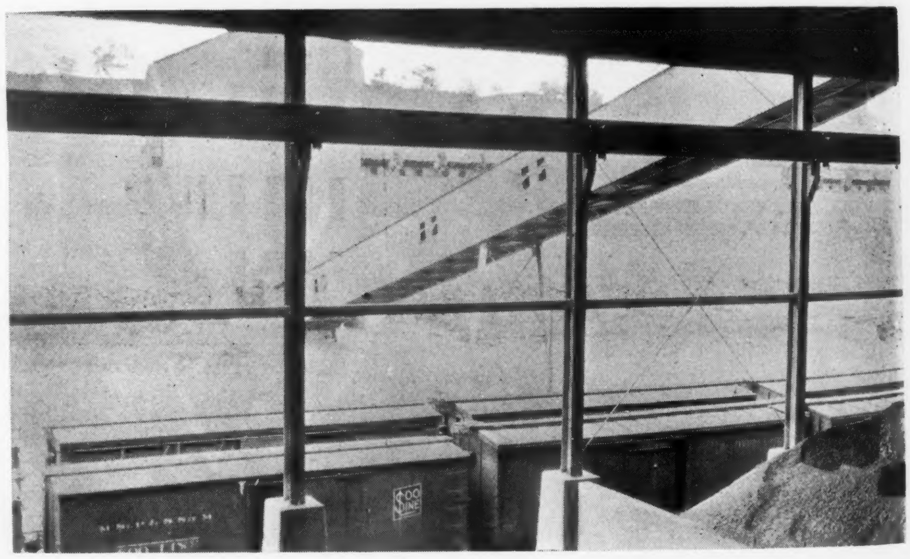
The crusher house is of reinforced concrete and steel construction, covered with corrugated iron siding. All the electrical equipment is interlocked so that no machine can be stopped without stopping the others, and neither of the crushers can be started until the belt conveyor is in motion. Push button controls are placed accessible to all the units. A 20-ton overhead traveling crane is provided for handling the equipment in the crusher house.

The 30-in. belt conveyor extends through an inclined gallery to the top of the storage

Drag-chain conveyor drive

building, where it discharges near the center of the building. A 10-ton overhead traveling crane with a 3-yd. clamshell bucket serves to distribute the crushed rock in the storage shed and to feed the raw-grinding mill hoppers. One end of this storage building is used for clinker. The storage capacity is 15,000 tons of rock and 42,000 bbl. of clinker under the roof, with provision for 20,000 bbl. of clinker outside beyond the end of the building.

The mill building adjoins and parallels a portion of the storage building. At present

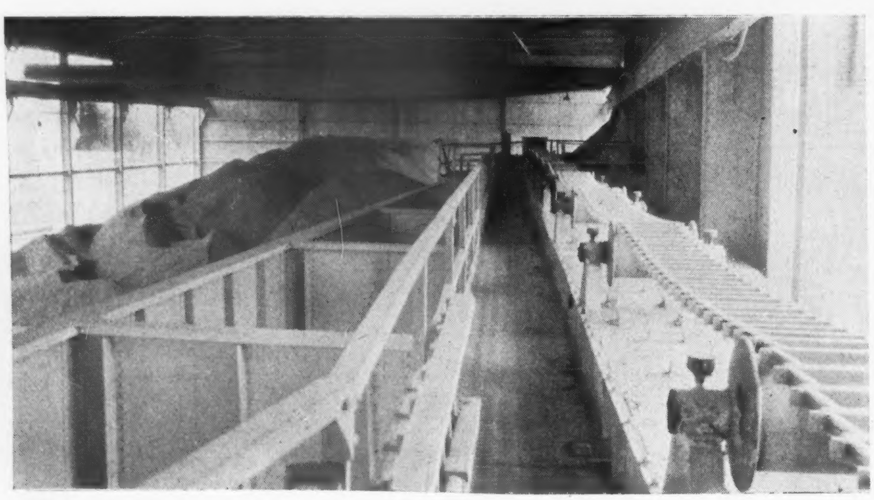


Looking out from the runway over the tops of the mill feed bins through the storage building to the crusher plant

there are two 7x26-ft. compartment mills at the raw end and two 7x26-ft. compartment mills on the clinker end, with provision for adding two more mills in the center of the building.

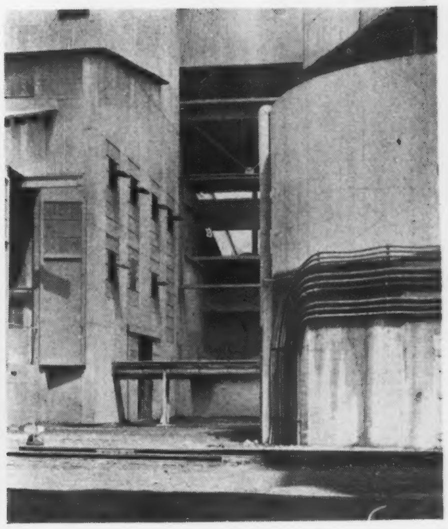
The mills are fed from a row of structural steel hoppers on the side of the storage building opposite, holding about 500 tons each. The overhead traveling crane, already referred to, feeds the stone hoppers and a drag-chain conveyor and the crane feed the clinker-grinding mills, as will be described further on. Water, of course, is added at the raw mills.

The 7x26-ft. compartment mills are each driven by a 500-hp. super-synchronous 2200-v., 180-r.p.m. motor. The motor room



Interior of storage building showing drag-chain conveyor for clinker at right

Interior of storage building looking out toward open end (west)



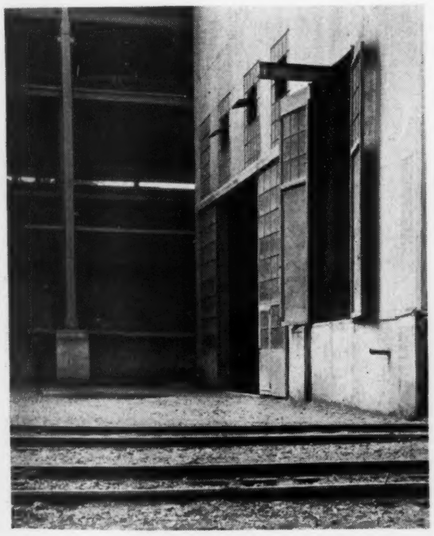
East entrance of mill building, showing screw conveyor carrying slurry

containing the motors and controls is entirely separated from the mill room.

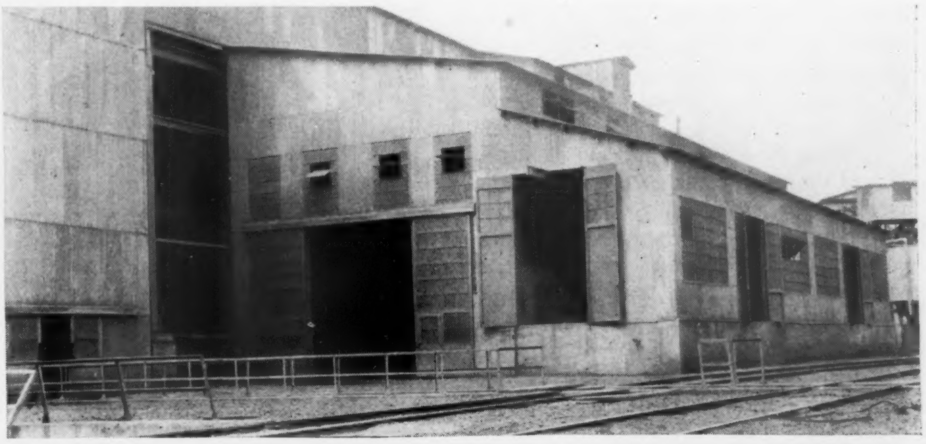
The slurry from the raw mills discharges to a screw conveyor between the mill building and the pump house. This conveyor is driven by a 10-hp., 440-v., 860-r.p.m. induction motor through a 16 to 1 spur-gear reducer.

Slurry Handling

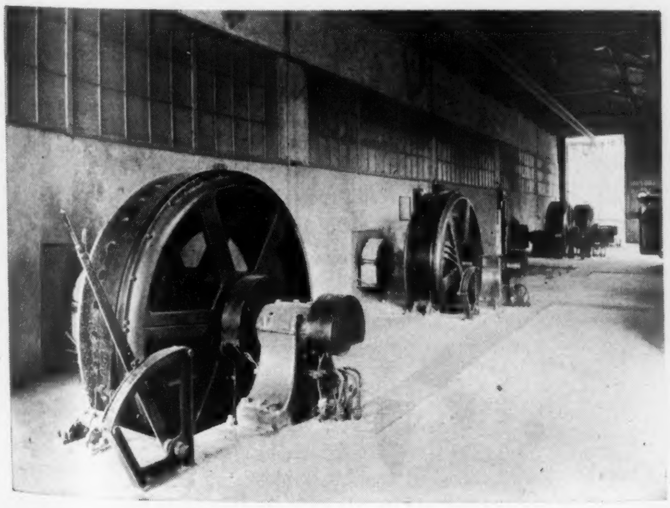
A battery of six rotary slurry pumps are fed from the receiving tank of the screw conveyor by gravity, and these pump the slurry to a battery of 11 reinforced-concrete slurry tanks arranged in a double row, eight of which, at the east end, are of 1000-bbl. capacity, and three at the west end, of 500-bbl. capacity each, and from these to the kilns. The space where the twelfth tank would be placed, to complete the row, is the pump house. This room is heated by an overhead system similar to quarry building.



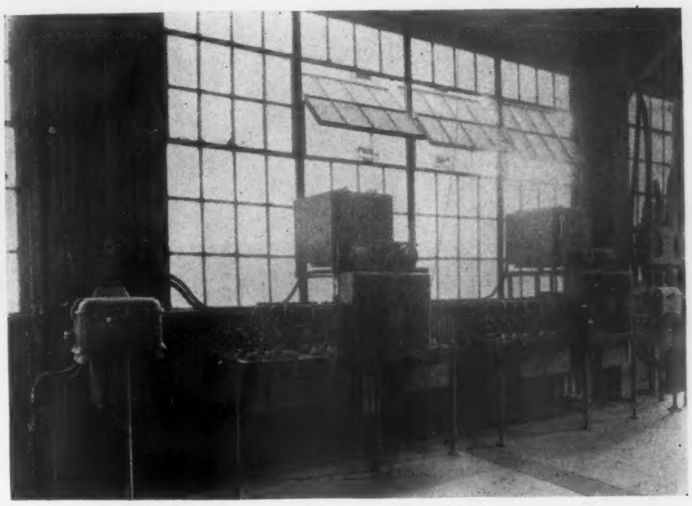
West entrance to mill building, storage building in background



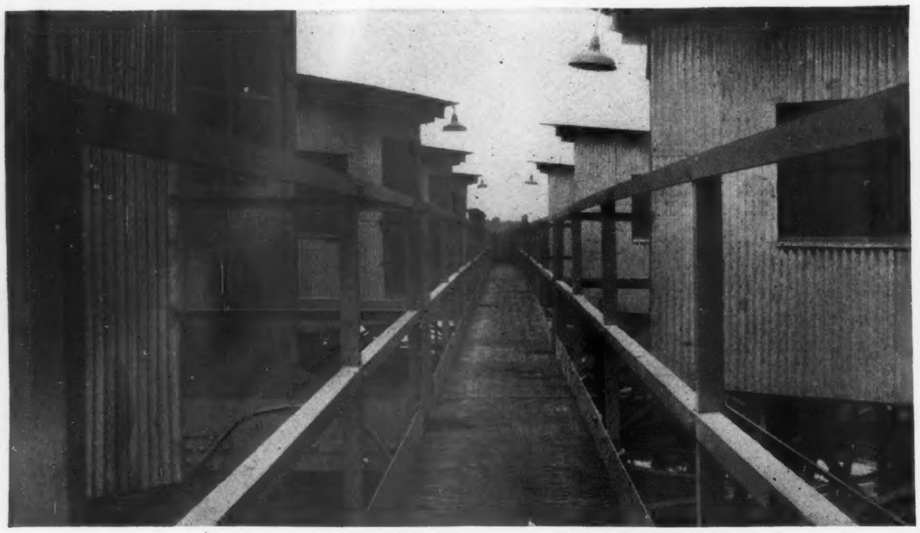
The mill building; the upper door at right opens into motor room



Super-synchronous motor drives on raw and finish mills



Switchboard and controls in synchronous motor room



Runway over tops of slurry tanks showing how motor-drives are housed

All pipes and valves for distributing slurry to the tanks are in a central gallery under the center of each row of tanks, in which ample headroom and elbow room is provided. A railed runway over the center line of the double row of tanks provides access to the motor houses over the centers of the tanks. A combined system of mechanical and compressed-air (440 cu. ft. per min.) agitation for the slurry is employed, the compressed-air pipe lines being in the same gallery containing the slurry pipes. The mechanical agitators of each tank are driven by 10-hp., 440-v., 860-r.p.m. motors connected through 27 to 1 spur-gear reducers.

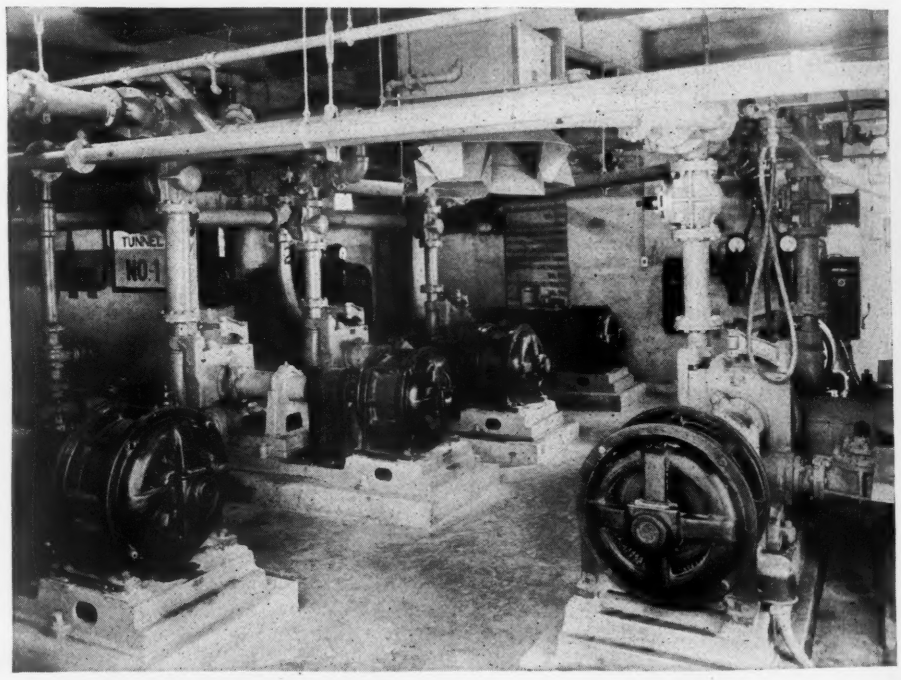
Three of the slurry pumps ordinarily take care of the plant, the other three being used as standbys. Occasionally, when handling exceptionally thick slurry more than three pumps are required. Each pump is direct-connected to a 30-hp., 440-v., 860-r.p.m., squirrel-cage electric motor. The slurry is normally pumped first to one of the three 500-bbl. tanks, which serve as blending tanks. The eight 1000-bbl. tanks are kiln-feed tanks, but the piping system is so arranged that any or all the large tanks may be used as blending tanks if desired. The slurry normally contains 33.4% water and is carefully maintained at this point.

The cylindrical slurry tanks rest on hexagonal foundations, which are hollow and are used for tool storage, a central oil-filtering plant, etc.

Kiln Feeds

From the kiln-feed tanks the slurry runs by gravity through pipes in accessible conduits to slurry pumps, which lift the slurry to the kiln feed troughs. One pump only is in service at any one time, the other being a standby.

From the kiln troughs the slurry is fed



Pump room where slurry is handled to tanks

by Ferris wheel type feeders, entirely enclosed, to the kilns. Each Ferris wheel feeder is direct driven through an 18 to 1 spur-gear reducer by a 3-hp. direct-current, variable-speed motor.

The kilns are 11x10x160 ft., being 11 ft. in diameter for 60 ft. They are lined throughout with high alumina refractory brick. Careful records of their performances will be made.

Pulverized coal is conveyed from the coal mill (described later) by an air-pump (pneumatic) system, and is fed to the kilns by No. 9 burners connected with low-pressure blowers, each driven by a 30-hp., 440-v., 1150-r.p.m. induction motor, direct connected. The screw feeders for the coal to the burners are driven by 2-hp. shunt-wound, direct-current, variable-speed motors. A recording draft gage shows the draft at both entrance and exit of the kiln. The kilns are also equipped with recording pyrometers.

Pipe gallery under the center of each row of tanks for both slurry and compressed air pipes and valves

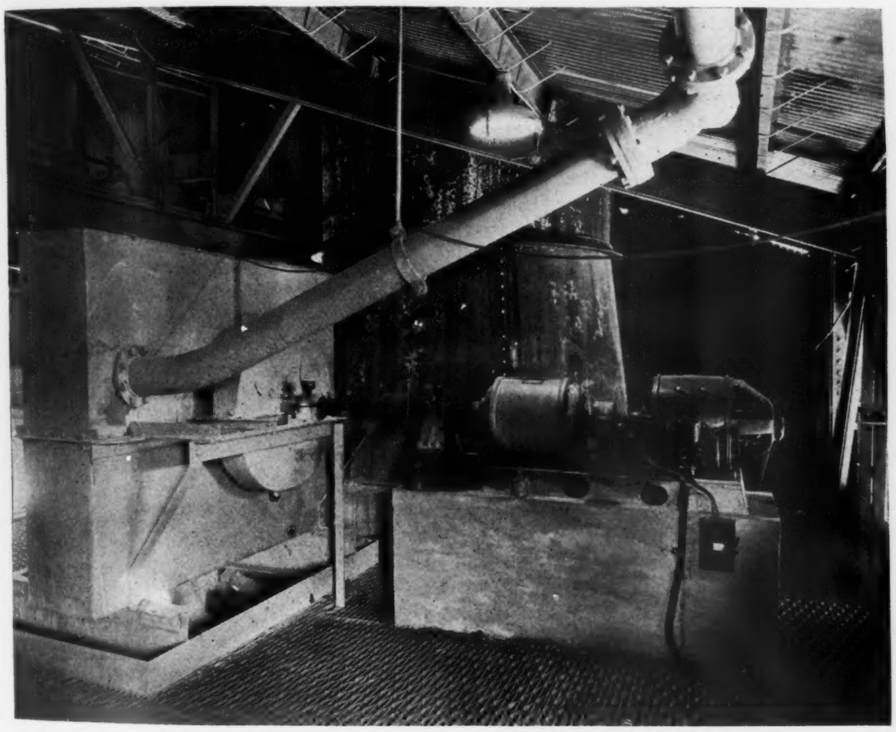
Each kiln is driven by a 75-hp., 440-v., 685-r.p.m. induction motor, of the slip-ring type, through a 5⅓ to 1 spur-gear reducer. The clinker coolers, 8x70 ft., are placed end to end of the kilns, with close connections, so that the draft through the coolers supplies part of the air for combustion in the kilns. The coolers are driven by 50-hp. slip-ring induction motors, 440-v., 860-r.p.m., through 5⅓ to 1 spur-gear reducers.

Clinker Coolers and Conveyor

The coolers have perforated screen ends which discharge the clinker to a concrete pit lengthwise across the ends of the coolers, over-size, brickbats, etc., being rejected over an end ring and deflector to the outer part of the pit, where they cannot get into the conveyor trough.

Mill building left (motor room) and kiln building

From the clinker pit at the ends of the kilns the clinker is moved in a reinforced concrete trough by a manganese-steel drag-chain conveyor, placed in an open, chilled iron lined trench, to an elevator building, alongside the west end of the rock and clinker storage building. The drag-chain conveyor is driven from this building by a 30-hp., 440-v., 850-r.p.m. slip-ring motor through a 27 to 1 spur-gear reducer.



Kiln feeds; enclosed Ferris wheel type of slurry feeders with direct motor drives

The drag-chain conveyor discharges to the boot of one of two chain bucket elevators, each driven through the head sprockets by a 15-hp., 440-v., 865-r.p.m. slip-ring motor through a 27 to 1 spur-gear reducer, and a silent chain drive.

Gypsum Handling

Gypsum is received in hopper-bottom cars, which are dumped in an open, concrete-lined track pit in the yard between the coal mill and the storage building. This pit holds two cars, or about 128 tons. The gypsum is transferred from the track pit to an elevated bin in the clinker elevator building by a locomotive crane on crawlers. This crane also serves as a general utility crane about the plant.

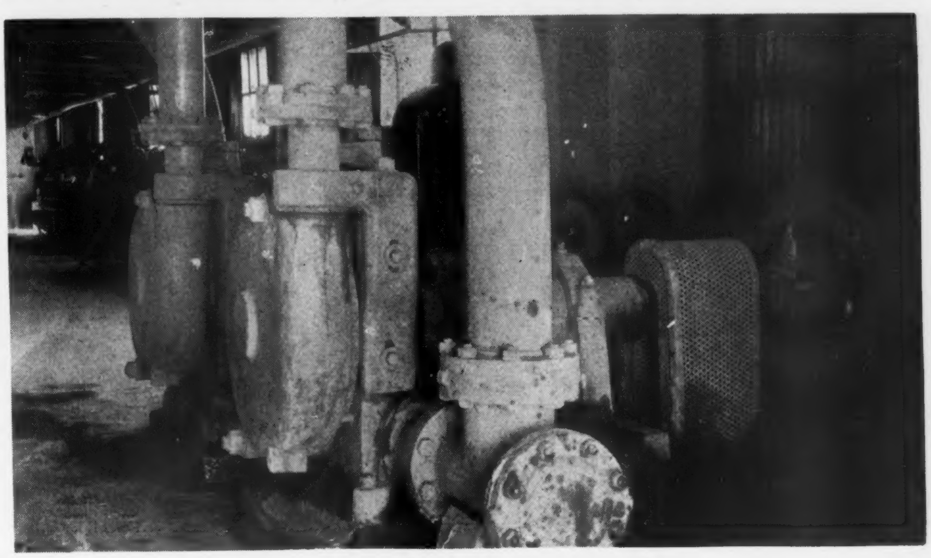
From elevated bins the clinker and gypsum are fed through automatic, continuous weighing machines to one of two clinker elevators, which discharge through spouts to the clinker storage at the west end of the storage building, or to the covered trough of a manganese-steel drag-chain conveyor extending over the tops of the clinker hoppers on the side of the storage building adjoining the mill building.

This conveyor is driven by a 15-hp., 440-v., 860-r.p.m. slip-ring motor through a 27 to 1 spur-gear reducer and a silent chain drive.

Clinker Grinding

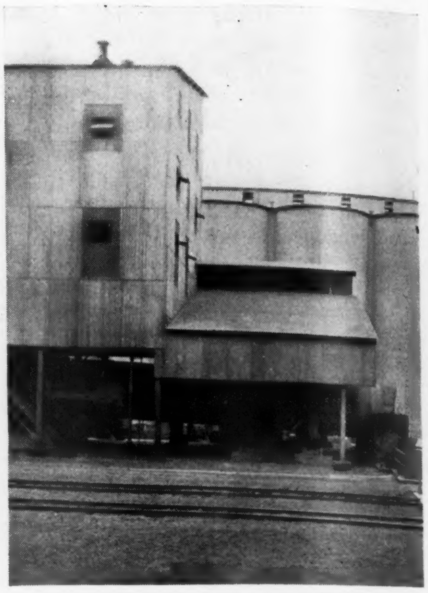
The clinker hoppers, holding about 1000 bbl. each, are the feed hoppers of the finish mills, and may thus be filled with fresh clinker by means of the elevator and drag-chain conveyor, or with storage clinker by means of the overhead traveling crane. The end hopper on the west end of the row is used for gypsum storage and is filled from large gypsum storage by overhead traveling crane.

The clinker is ground in two 7x26-ft. compartment mills, as already explained, with space provided for two more mills when they are found necessary.

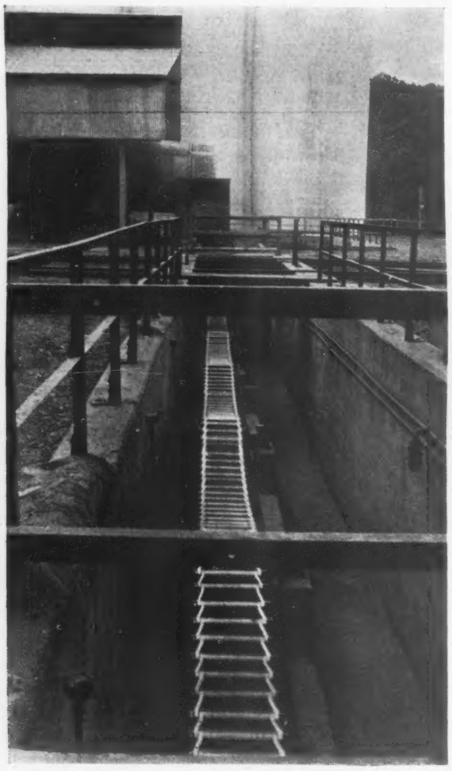


Slurry pumps which feed the kiln tanks

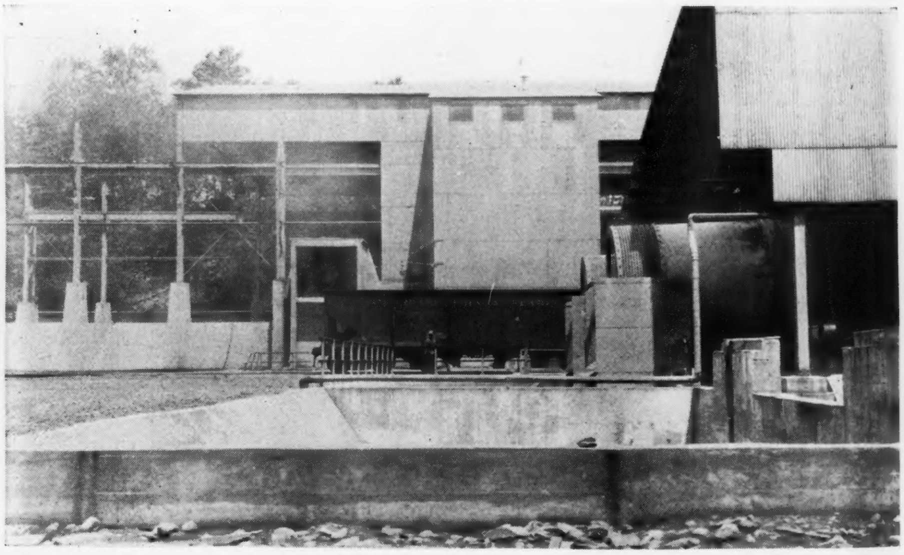
Looking west along kiln building—coal mill in background—car in the right background stands over hopper into which gypsum is delivered



End of kiln building with cement silos in background



Looking along the conveyor trench from clinker elevator building to cooler ends



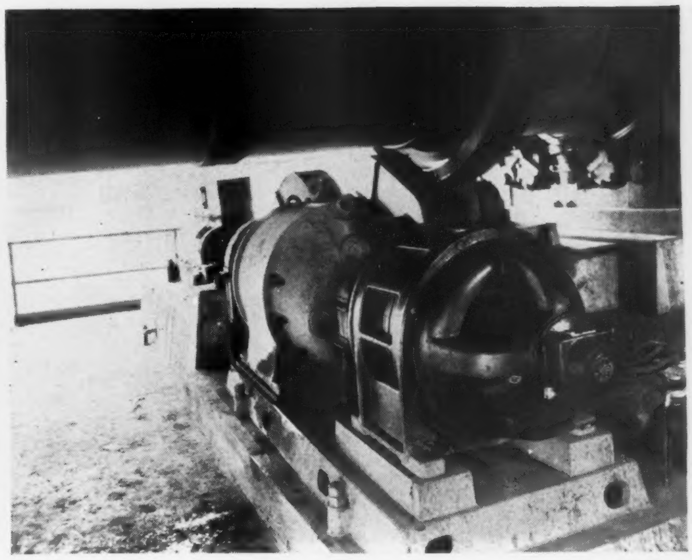
Clinker pit and ends of coolers—storage building in the background

The finished cement is removed from the mills by a screw conveyor, driven by a 10-hp., 440-v., 860-r.p.m. induction motor through a 16 to 1 spur-gear reducer. The conveyor feeds one of two 6-in. air-cement or pneumatic pumps, which are in a pit on the ground floor of the mill building. This pump (the second is a standby) delivers the cement through a 6-in. pipe line in conduit to the tops of the silos, where it may be

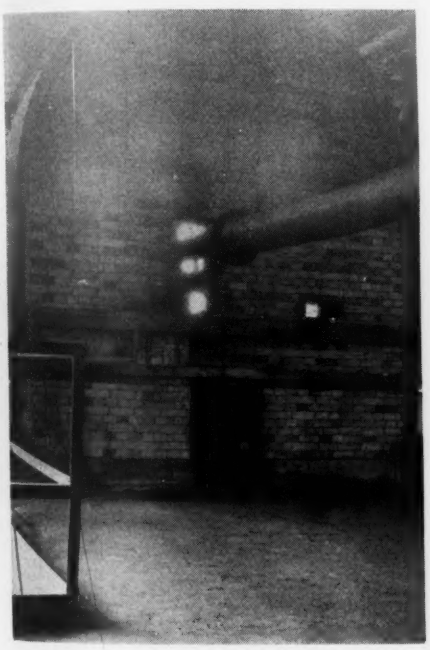
Drag chain conveyor from clinker pit to storage building

Another view of drag chain conveyor at the clinker pit

Motor drive on drag chain conveyor (in elevator building)



Motor drive on 160-ft. kilns

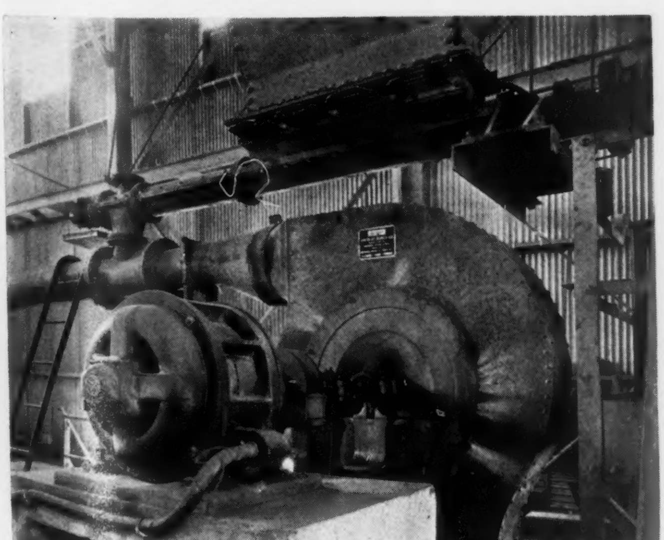


Kiln hood and burner

placed in any one of the eight silos, which have a total capacity of 108,000 bbl., including the intercellar spaces. The pumps are each driven by a 50-hp., 440-v., 685-r.p.m. induction motor, direct-connected.

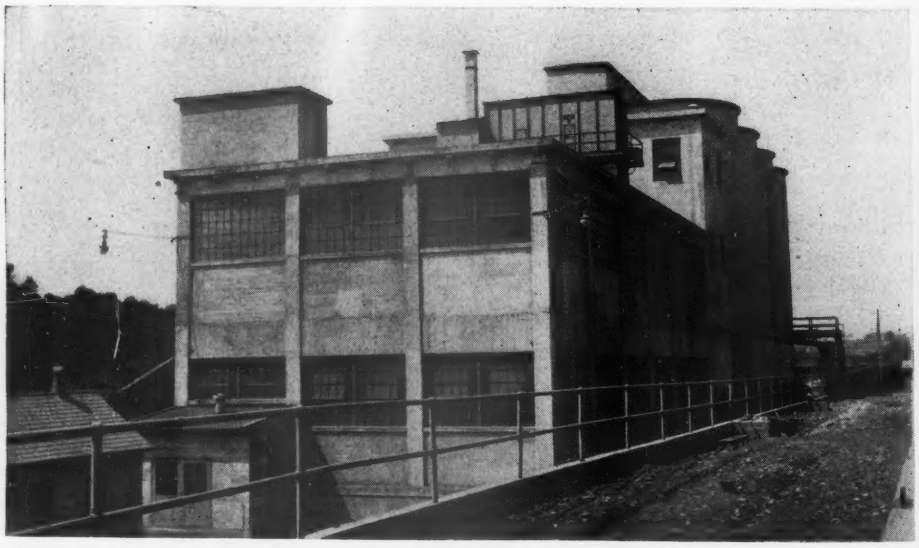
The pack house is undoubtedly one of the finest in the portland cement industry; it is reinforced concrete throughout, with a bag-storage and bag-cleaning room at the east end. The bag cleaner is entirely enclosed.

Looking down runway between the two kilns

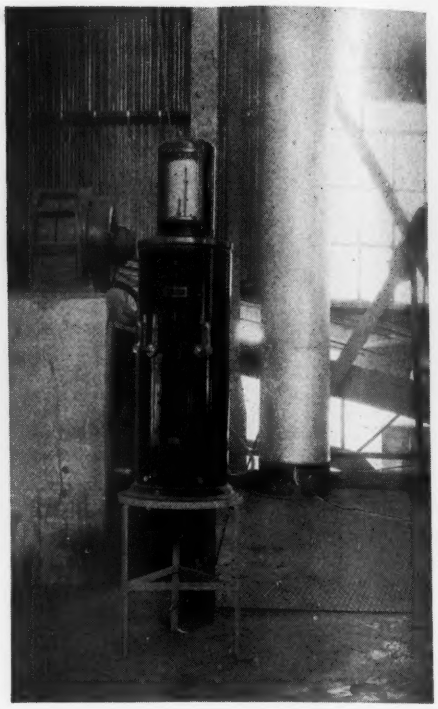


Motor drive on kiln burner blowers

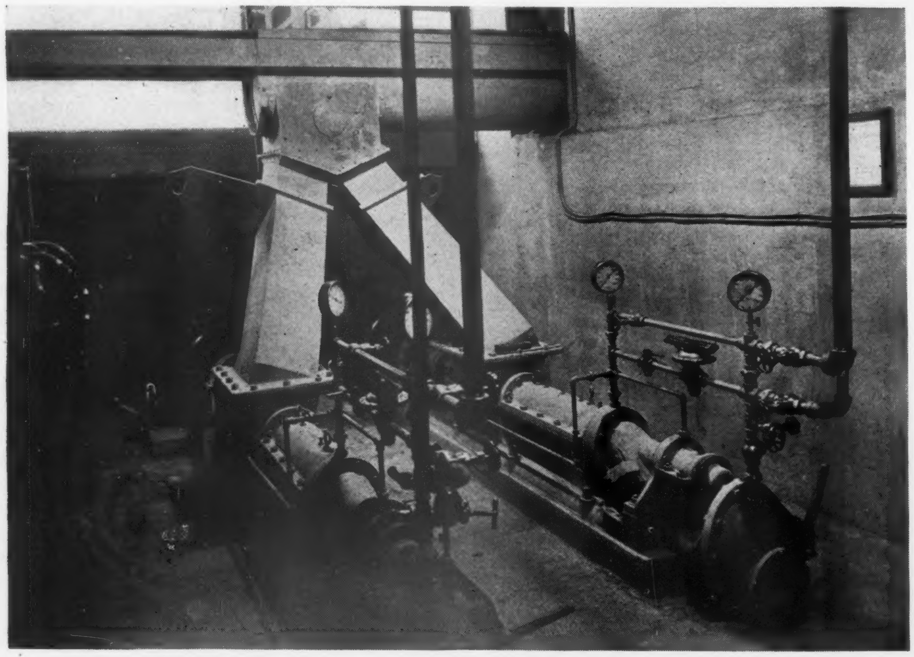
Motor drive on clinker cooler



Pack house from the level of the power house

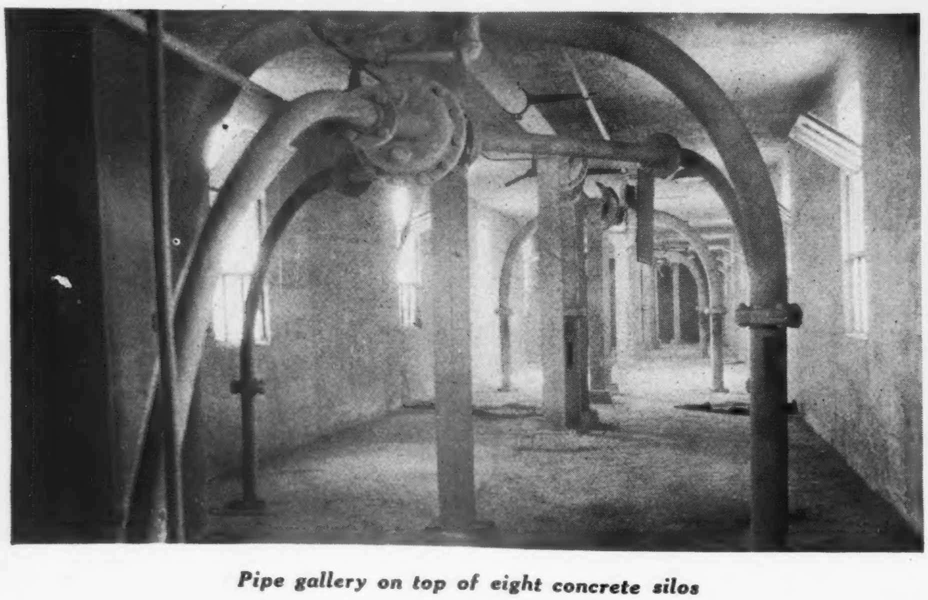


Recording instrument shows draft

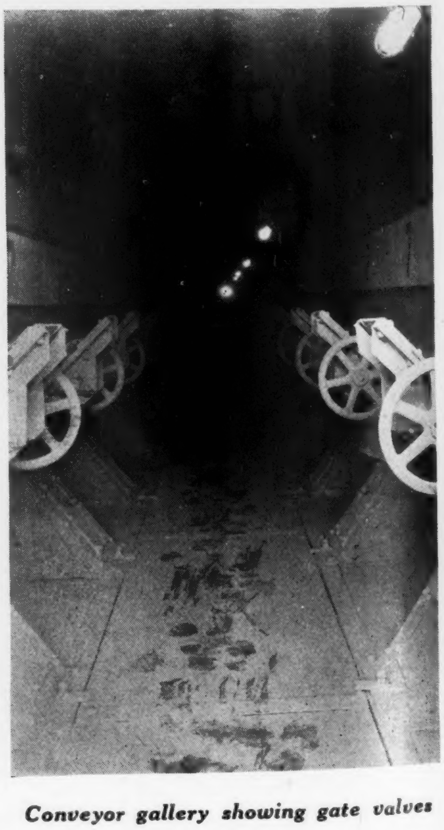


Pneumatic pumps for transferring cement from mills to silos

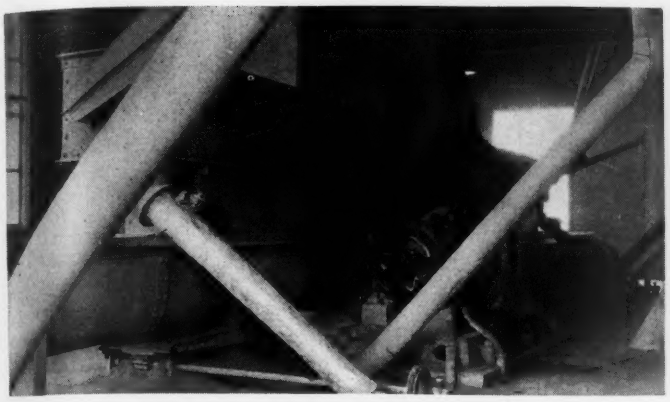
It is driven by a 20-hp. squirrel-cage induction motor (440-v., 865-r.p.m.) through a spur-gear reducer and a silent chain drive. The bag cleaner is equipped with a dust collector. The packing room itself contains four 3-valve packing machines, arranged in pairs. Each packing machine is driven by a 15-hp., 440-v., 955-r.p.m. induction motor, direct-connected. There is a dust collector for each pair of bagging machines, and a



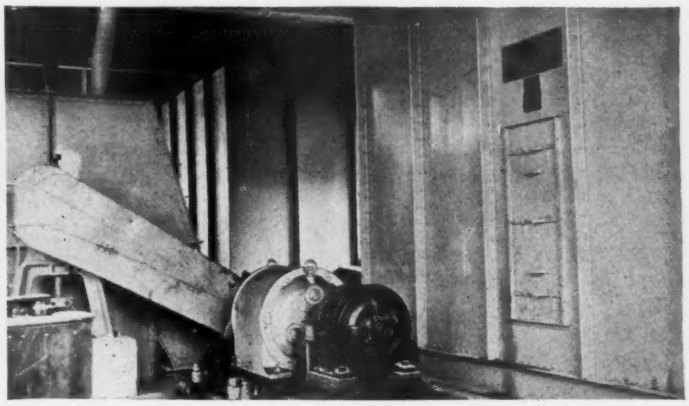
Pipe gallery on top of eight concrete silos



Conveyor gallery showing gate valves



Screw conveyors in pack house for filling packing machine bins



Dust collectors (right) and motor drive on elevator in pack house

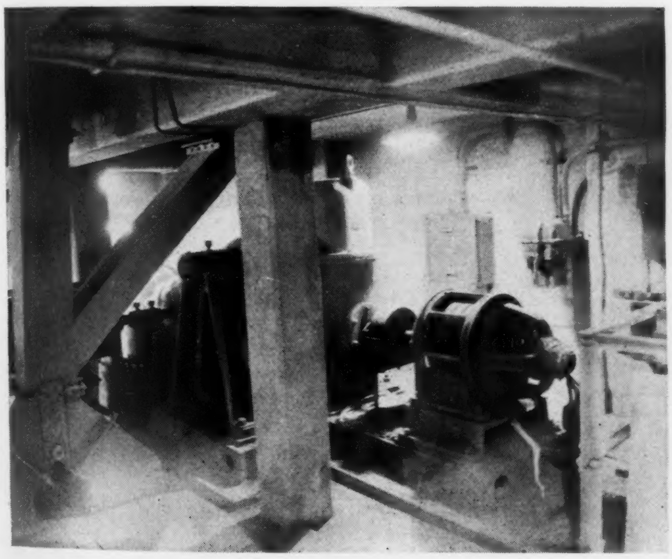
4-in. air-cement pump to return the cement recovered from the packing machines and bag cleaner to the bins.

Loading tracks are provided on both sides of the pack house, and each packing machine is served by a belt conveyor to the car door.

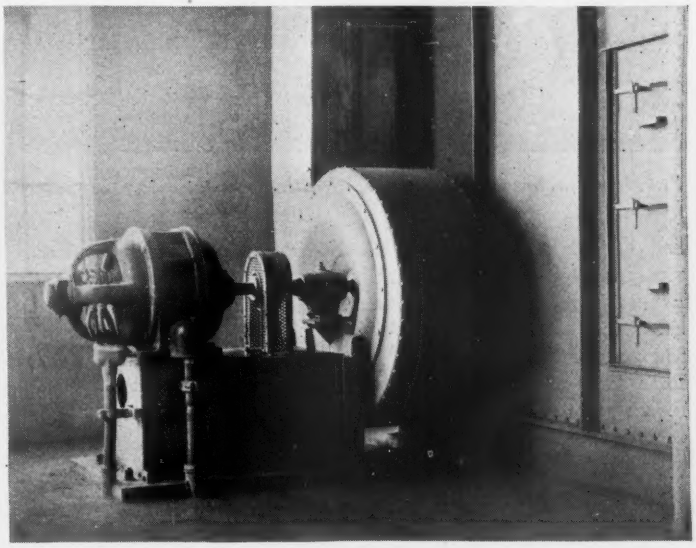
The cement is removed from the storage silos by screw conveyors, accessible for their whole length, in a gallery under the silos. The gate valves of the silos are all reached by these parallel galleries. It is possible to feed the packing machine bins with any combination of cement from the different silos. The screw conveyors under the silos are driven by 40-hp., slip-ring, 440-v., 850-r.p.m. motors through 13 to 1 right-angle worm-gear reducers.

Two elevators take the cement from the two screw conveyors under the silos to screw conveyors over the packing machine bins. The elevators are driven by 15-hp., 440-v., 865-r.p.m. induction motors through 27 to 1 spur-gear reducers and silent chain drives. The screw conveyors to bins are driven by 10-hp., 440-v., 860-r.p.m. squirrel-cage motors through 16 to 1 spur-gear reducers and silent chain drives.

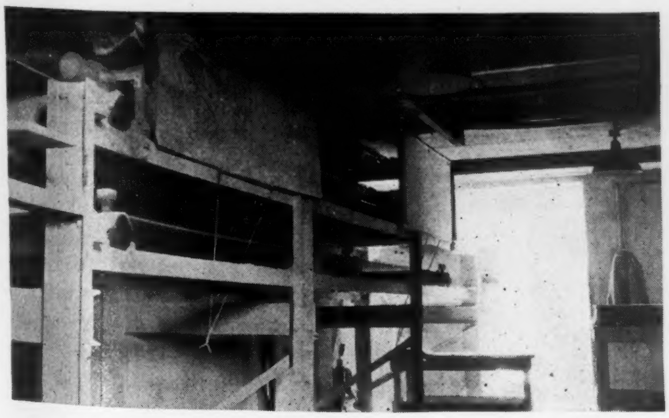
In the same room over the packing bins, containing the elevator drives, are the motors, fans and dust collectors for the packing machines. The fans are size 50 and are driven by 25-hp., 440-v., 1125-r.p.m. slip-ring motors, direct-connected. The dust-



Screw conveyor drive for cement conveyors under silos



Fan and motor drive on dust collectors in pack house



Bag-packing machines from below showing belt conveyors for loading cars

Bag repairing, storage and elevating room at east end of pack house

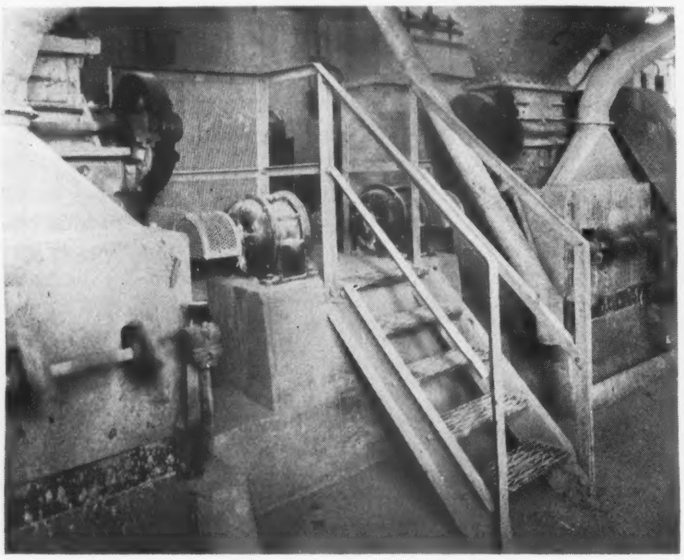
collecting unit for the bag house and bag-cleaning machine are on the roof of that part of the pack house.

The coal mill, waste-heat power plant and the auxiliary buildings will be described in the succeeding part of this article, to be published in ROCK PRODUCTS, August 21.

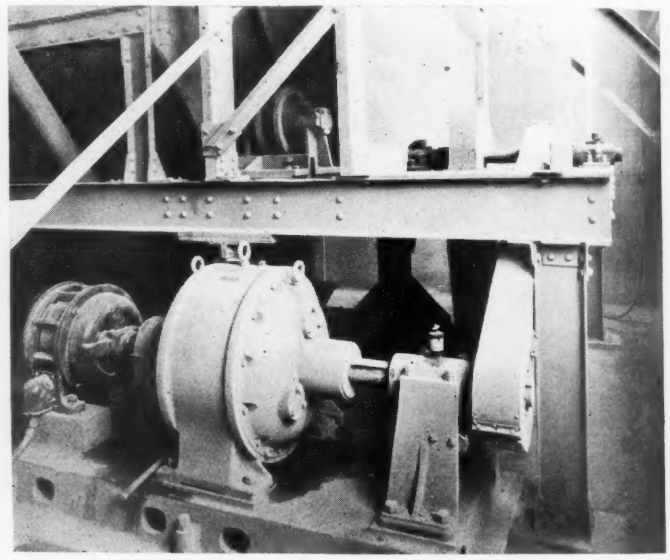
Officers and Personnel

The officers of the Lehigh Portland Cement Co., whose home office is at Allentown, Penn., are: Harry C. Trexler, chairman of the board of directors; E. M. Young, president; Daniel E. Ritter, vice-president and general manager; B. L. Swett, vice-president and eastern sales manager; B. H. Rader, vice-president and Western sales manager; Ernest Ashton, vice-president and chief chemist; Joseph S. Young, vice-president and assistant to the president; Raymond R. Bear, vice-president and chief engineer; F. E. Paulson, vice-president and traffic manager; Alonzo F. Walter, secretary and treasurer. "Jimmie" Gish — so known to portland cement men all over the United States and Canada—formerly superintendent of Bath Portland Cement Co., is superintendent of the Sandt's Eddy plant, and was the superintendent of construction.

(To be continued)



Packing machines and drives, showing accessibility of motors



Motor drive on bag-cleaning machine

Patents Slurry Process

R. C. NEWHOUSE, vice-president and general manager of the engineering department of the Cowham Engineering Co., Chicago, has been recently granted a patent on a process for the prevention of setting of slurry made from blast furnace slag.

As a result of experiments conducted by the Allis-Chalmers Mfg. Co., Milwaukee, under the direction of Mr. Newhouse it was discovered that the tendency of materials such as ground slag to absorb water and to solidify may be retarded and substantially eliminated if the temperature of the mixture of slag and water is reduced to substantially normal or atmospheric temperature as soon as the mixture leaves the source of heat. If the material is cooled immediately after it leaves the comminuting mill and before it is delivered to storage tanks, subsequent hardening or setting within a reasonable time is prevented and the material may be withdrawn without difficulty.

The patent provides for this treatment of cooling the slurry either by circulating it through a cooling chamber or inducing a cooling medium, such as water, directly into the mixture. For the first method a cooling chamber similar in principle to automatic refrigeration brings the slurry in contact with chilled pipes. The second method is a modification to effect commercial utilization of the process. In this method the excess water must be removed prior to subsequent treatment of the material in a kiln.

Lawrence Portland Buys Interest in New England Company

PURCHASE by the Lawrence Portland Cement Co. of Northampton, Penna., of an interest in the New England Portland Cement and Lime Co., of which Alfred S. Black is the president, links the local corporation up with the biggest independent cement concern in the country and also one of the strongest financially.

The Lawrence corporation is also one of the oldest cement manufactories in the United States, and its main office is located at Sigfriend, near Northampton. Other offices are maintained by the company at New York City.

The Lawrence plant at Northampton, engaged in the manufacture of Dragon cement, turns out 6,700 bbl. or nearly 40 carloads, daily, and this production is maintained throughout the year. The plant at present has 15 rotary kilns.

The lime portion of the new manufactory will be finished, it is said, within a short time, but some months will be required for the completion of the cement section.—*Bangor (Me.) Commercial.*

"Jimmie" Gish, superintendent

Machine Indicates Automatically Setting Time of Cement

A RECENT issue of *Engineering News-Record* describes a machine devised by A. A. Jakkula for determining automatically the setting time of cements. The machine as designed consists essentially of a cement sample tray which is moved periodically under a set of Gilmore testing needles. The movement of the tray and the raising and lowering of the needles are effected by cams on a governed-speed shaft. A glass box containing water trays will be constructed around the machine so that the tests on cement carried out on it will comply with the A. S. T. M. requirements calling for the samples to be surrounded by moist air.

The apparatus was designed and constructed at the Experimental Engineering Laboratories of the University of Minnesota.

Mathers Patents Process for Making Any Dolomitic Lime Plastic

Calcining Stone with Sodium Chloride (Common Salt) Claimed to Result in Hydrates Equal to Best Finishing Hydrates

PROF. FRANK C. MATHERS, of Indiana State University, Bloomington, Ind., who is well known in the lime industry through his research work for the National Lime Association, has patented a process of burning dolomitic limestones so as to make the resulting lime give a highly plastic hydrate. Herman T. Briscoe, co-inventor with Professor Mathers, has assigned his share to Professor Mathers. The process is described as follows:

"By our invention the ordinary dolomitic limestones can be used to produce quicklime and dry hydrates having the following valuable properties, viz.:

"(1) Dry hydrated lime prepared according to our process from ordinary dolomitic limestone when subsequently made into a putty with water becomes plastic.

"(2) The quicklime prepared according to our process from ordinary dolomitic limestone is soft and may be rubbed or ground to a fine powder much more easily than ordinary quicklime.

"(3) The quicklime produced by our process is less active toward water and slakes to a finer hydrate than the ordinary quicklime which may slake or react with water with an almost explosive effect. This very great and undesirable activity of quicklime towards water is found especially in those dolomitic quicklimes which are burned at low temperatures or for short periods of time at somewhat higher temperatures. The latter conditions of burning are found especially with rotary kilns. These very active quicklimes produce dry hydrates that are coarse or 'sandy.' Such hydrates are highly undesirable in that they are very non-plastic and lack in 'sand-carrying capacity.'

"In carrying out our process we take ordinary dolomitic limestone and add to it sodium chloride or a similar alkali metal salt of a mineral acid, such as potassium chloride or sodium sulphate. This salt may be added to the limestone in the kiln as a dry salt prior to or during the burning or calcining of the limestone, or the limestone may be treated with a solution of the salt before it is put into the kiln. If it is moistened with a solution of the salt, we preferably use a 10% solution of the salt. Whether the salt is added in dry form or as a solution, we preferably add to the limestone when a rotary kiln is used about .60% by weight of the limestone to be treated. We prefer to add .60% of the salt because if a larger amount is added no better results are apparently attained and the salt may be wasted by volatilization unless the vapors are led away and condensed. If a smaller amount of the salt is used the plasticity of the hydrate when subsequently soaked is less than when .60% is added. As will be evident, however, the amount of salt can be varied above and below to a very considerable extent in carrying out our invention according to varying conditions of operations of the kilns and differences in the degree of plasticity and activity toward water and softness to be attained.

"In burning a mixture of the limestone and the salt, good results are obtained if they are burned at temperatures of 1000 deg. to 1200 deg. C. for a period varying from two hours at 1200 deg. C. to fifteen hours at 1000 deg. C., these being substantially greater than the range of temperature and time commonly used in making quicklimes from ordinary dolomites. We prefer 1100 deg. C. for two hours of actual burning. It must be remembered that the temperature and time of burning in ordinary practice vary greatly in different plants. Also the temperature and the actual time of burning cannot be easily determined. It must be remembered that the higher the temperature the shorter should be the time of burning.

Quicklime Produced by This Process Easily Reduced to Powder

"The quicklime thus produced by our process is so soft that it can be easily reduced to a powder, which is not the case with quicklimes produced from ordinary unsalted dolomitic limestone by the same burning treatment. In one specific case the crushing strength of the quicklime from the stone that had been treated with salt was 2158 as compared to 6880 for the quicklime from ordinary or untreated stone. However, the higher the temperature of burning, the harder the quicklime. This agrees with the commercial experience in burning ordinary limestone. We prefer low temperatures if a soft quicklime is desired.

"After calcining the limestone treated with the salt we grind the quicklime, as is the practice in ordinary plants desiring to make hydrated lime.

"The activity of such powdered quicklime is such that upon the addition of the water it does not become hot from the reaction for a minute or two after it is mixed with the water. Quicklime made from ordinary dolomitic limestone in the ordinary manner by burning at a low temperature or at a high temperature for a short period of time, hereinafter called 'untreated quicklime,' when mixed with water, reacts instantly and sometimes with almost an explosive effect. Increased temperature and time of burning ordinary limestone decreases this activity towards water just as it will do with treated limestone. Too great activity of the quicklime towards water is not a problem in many lime plants unless rotary kilns are used.

Hydrated in Usual Manner with 25% to 30% of Water

"After grinding the quicklime we hydrate it in the ordinary way familiar to those skilled in the art of making finishing hydrates. We prefer to use 25% to 30% of water based on the weight of the quicklime. The actual per cent of water necessarily varies with the particular stone that has been burned. We prefer to use as low a per cent of water as possible without leaving seriously objectionable amounts of incompletely hydrated calcium oxide in the final hydrate.

"The final hydrate produced by our process as thus far described is passed through a mill such as the Raymond or the Bonnett and finally bagged—all in the ordinary way familiar to those skilled in the art of making finishing limes, the result being a dry hydrated lime produced in accordance with our invention. When subsequently soaked overnight this hydrated lime has a plasticity as determined by an Emley-Berry plasticimeter of above 200, so as to be within the range designated by the Bureau of Standards in Circular No. 204, as 'plastic or finishing limes.' A dolomitic limestone from Pennsylvania which when analyzed showed—

Magnesium carbonate	44.66%
Calcium carbonate	54.68
Iron oxide	.47
Aluminum oxide	.56
Silicon dioxide	.81

when treated in accordance with our method as above described gave a plasticity number of 367 on the Emley-Berry plasticimeter, which puts the hydrates produced from ordinary dolomitic limestone by our process in the same class with the Woodville hydrates.

"Not only is the plasticity referred to a

valuable characteristic, but the reduction in the activity of lime is also very valuable, especially in the cases of those quicklimes produced at low temperature or by short periods of burning at higher temperatures such as in rotary kilns, since these very active quicklimes cannot be handled in the ordinary manner, and, what is even more serious, they produce a 'sandy' or coarse, dry hydrated lime. Our quicklime is therefore superior under these conditions to ordinary untreated dolomitic quicklimes.

"The plasticity referred to can be attained to some extent by using sodium sulphate and other similar salts in place of sodium chloride, which latter is preferred on account of its effectiveness and cheapness. As much as 2% of salt can be used without bad effect on the plasticity. Increasing the amount of salt makes the quicklime somewhat harder, but does not seem to interfere with the plasticity of the subsequently moistened dry hydrate.

"The salts which we add are those of the alkali metals having atomic weights between 22 and 40, inclusive, thus including sodium and its equivalents, and are alkali metal salts of mineral acids.

"It is not the idea of this invention to depart in any way from the methods of burning the dolomitic limestones and of hydrating or treating the quicklimes or the hydrates as commonly carried out under the best commercial practices of today, but it is the idea of this invention to improve the quality of the quicklime and the products thereof by burning the ordinary dolomitic limestones in the presence of chemical salts such as are disclosed in this invention.

Nine Claims Made for This Process

"As will be evident to those skilled in the art, our invention permits of various modifications without departing from the spirit thereof or the scope of the appended claims. What we claim is:—

"1. The method of treating ordinary dolomitic limestone which consists in adding a mineral acid of an alkali metal thereto and calcining the same, producing a quicklime of retarded activity in slaking.

"2. The method of treating ordinary dolomitic limestone which consists in adding a sodium salt of a mineral acid thereto and calcining the same, and subsequently converting it into a dry hydrate.

"3. The method of treating ordinary dolomitic limestone which consists in adding sodium chloride thereto and calcining the same, producing a quicklime of retarded activity in slaking.

"4. The method of treating ordinary dolomitic limestone which consists in adding sodium chloride thereto and calcining the same and subsequently converting it into a dry hydrate.

"5. The method of treating ordinary dolomitic limestone which consists in adding a sodium salt of a mineral acid thereto in the form of an aqueous solution and calcining the same, and subsequently converting it into a dry hydrate.

"6. The method of treating ordinary dolomitic limestone which consists in adding approximately .60% of a mineral acid salt of an alkali metal, by weight, to the limestone and calcining the mixture and forming the resultant product into a dry hydrate.

"7. The method of treating ordinary dolomitic limestone which consists in adding thereto a mineral acid salt of an alkali metal having an atomic weight between 22 and 40, inclusive, calcining the mixture and converting the resultant product into a dry hydrate.

"8. The method of treating ordinary dolomitic limestone which consists in adding an alkali metal salt of a mineral acid thereto and calcining the same in a rotary kiln, producing a quicklime of retarded activity in slaking.

"9. The method of treating ordinary dolomitic limestone which consists in adding an alkali metal salt of a mineral acid thereto and calcining the same in a rotary kiln, producing a quicklime of retarded activity in slaking, the salt being by weight approximately .60% of the limestone treated."

Stone Production Increased in 1925

THE Bureau of Mines, Department of Commerce of the United States, has issued a preliminary report on the stone production of 1925, which shows an increase in both building stone and crushed stone for the year.

Building stone increased 6% over 1924, the total being 30,115,000 cu. ft. More than one-half was limestone and the increase in this was 9%. Dressed granite increased about 11% and marble 10%. Sandstone for building showed a decrease of about 15%. Monumental stone showed a decrease of about 8%.

Street and road material in general showed increased sales in 1925, although sales of paving blocks (39,787,000 blocks, valued at $3,657,000) decreased 3% in quantity, and stone sold for flagstones (755,000 cubic feet, valued at $562,000) decreased 7%. Stone sold for curbing (4,936,000 cubic feet, valued at $4,310,000) increased 29% in quantity. Total crushed stone amounted to about 75,110,000 short tons, valued at $80,120,000 in 1925, an increase of 10% in quantity, although final figures may show a somewhat higher percentage of increase. Crushed stone for concrete and road work (62,420,000 tons, valued at $69,750,000) increased 8% in quantity, and crushed stone reported as used for railroad ballast (12,690,000 tons, valued at $10,370,000) increased about 20%.

Stone sold for fluxing to blast furnaces, open hearth steel works, smelters, and other metallurgical plants, amounted to about 22,634,000 short tons, valued at $17,100,000, an increase of 15%in quantity.

Stone reported for refractory use, which includes dolomite, quartzite and mica schist, amounted to 1,224,000 short tons, valued at $1,554,000, in 1925, an increase in quantity of 12%. Raw dolomite reported as sold for the manufacture of refractories in 1925 amounted to 415,710 short tons, valued at $381,215. Besides this quantity, operators who both quarry and dead-burn or sinter dolomite reported 392,145 tons of sintered material, valued at $3,730,509. The quantity of raw dolomite reported was 35% more than in 1924, and the sintered material increased 19%. Quartzite (ganister) used in the manufacture of refractory brick, for furnace lining, and for the manufacture of ferro-silicon, amounted to 769,690 short tons, valued at $1,018,385. This was an increase of 2% in quantity. Sales of mica schist for furnace and kiln lining, which is quarried in Montgomery County, Penn., near Edge Hill, amounted to 38,600 tons, valued at $154,400, an increase in quantity of 36%.

Sales in 1925 of pulverized limestone for agricultural use amounted to about 1,970,000 tons, valued at $2,300,000, an increase of 46% in quantity over the sales for 1924.

The accompanying table shows the estimated sales of stone in 1925 by uses and the sales for 1924 for comparison.

STONE SOLD OR USED BY PRODUCERS IN THE UNITED STATES, 1924 and 1925, BY USES

Use	1924 Quantity	1924 Value	1925 Quantity	1925 Value
Building, cu. ft.	28,352,380	$33,175,656	30,115,000	$34,687,000
Approximate equivalent in short tons	2,211,750	....	2,400,000	....
Monumental stone, cu. ft.	4,750,980	15,305,386	4,361,000	14,330,000
Approximate equivalent in short tons	393,000	....	361,000	....
Paving blocks, number	41,037,570	3,578,676	39,787,000	3,657,000
Approximate equivalent in short tons	375,860	....	362,000	....
Curbing, cu. ft.	3,815,850	3,468,821	4,936,000	4,310,000
Approximate equivalent in short tons	296,070	....	383,000	....
Flagging, cu. ft.	810,440	560,156	755,000	562,000
Approximate equivalent in short tons	59,840	....	56,000	....
Rubble, short tons	864,790	1,160,258	880,000	1,200,000
Riprap, short tons	3,265,130	3,634,439	3,300,000	3,700,000
Crushed stone, short tons	68,198,440	73,861,576	75,110,000	80,120,000
Furnace flux (limestone and marble), short tons	19,690,490	15,839,868	22,634,000	17,100,000
Refractory stone (ganister, mica schist and dolomite), short tons	1,093,940	1,389,413	1,224,000	1,554,000
Manufacturing industries (limestone and marble), short tons	4,733,770	4,410,559	5,000,000	4,800,000
Other uses (chiefly agricultural limestone), short tons	2,000,490	5,485,305	2,600,000	5,400,000
Total (quantities approximate, in short tons)	103,184,120	$161,870,113	114,310,000	$171,420,000

A Flux Stone Plant in Alabama

The Rockwood-Alabama Stone Company Have a Deposit of Very Pure Limestone Which They Work into Flux Stone, Rip-Rap and Dimension Building Stone

THE Rockwood-Alabama Stone Co. quarry near Russellville, Ala., is unique in that, while it produces a number of products and operates three crushing plants, it produces no commercial crushed stone of the ordinary screened sizes. Its main product in point of tonnage is flux for the iron furnaces of Birmingham and Sheffield. Crusher dust is sold for agricultural limestone and large pieces are shipped for rip-rap, to be used in the various river improvement projects necessary to confine Southern rivers. In addition there is a large business in dimension and cut stone, this being a more recent addition to the plant's activities.

The ledge quarried is a very pure oolitic limestone, running 99% or better in calcium carbonate. It stands 70 ft. high and there is a band some 35 ft. wide through the center of extremely firm and fine-grained stone from which dimension stone is cut. But in the regular quarry operation the whole face is shot down in the usual way.

The holes are drilled 5 ft. below the quarry floor and loaded with 60% and 40% Dupont powder. There is some 4½ ft. of tamping near the top and half a box of powder is put in at the top of the hole to shatter the surface. Each shot brings down from 30,000 to 40,000 tons of rock and but little pop shooting is needed to reduce the pieces to a size that can be handled by the shovels.

Stripping is by hand and the dirt is hauled away in wagons. This looks to be an uneconomical method but it is not. The stripping is full of boulders of good limestone and these are rolled down into the quarry as they are freed from the dirt and recovered in that way. Enough stone is recovered to justify the cost of the method over the use of a steam shovel.

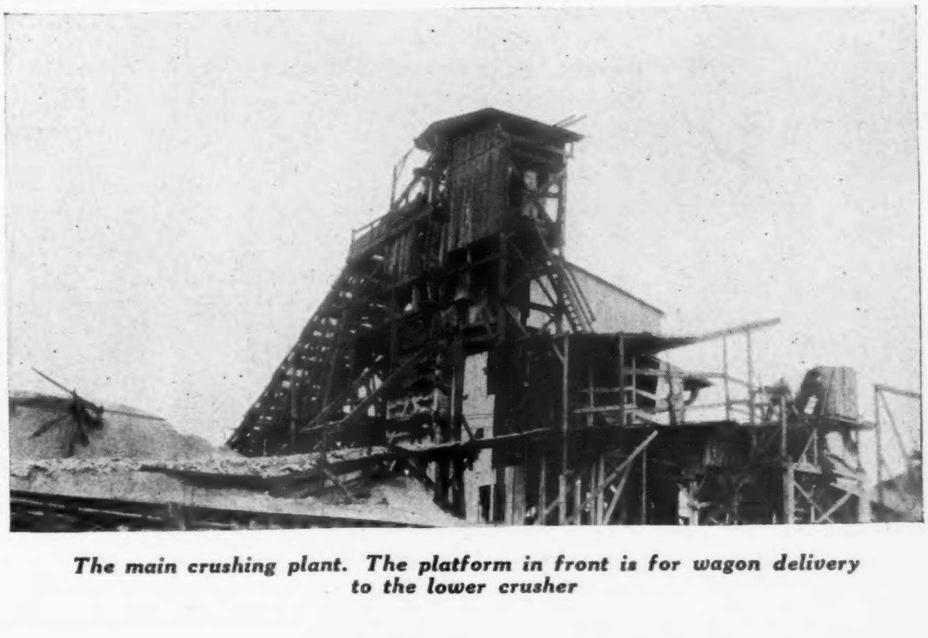
There are three 18-B Bucyrus shovels used in loading. These load into "Western" side dump cars which hold five tons each. They are hauled to the plant by three 12-ton Porter locomotives and one 12-ton locomotive made by the Vulcan Iron Works.

The quarry. The band which shows in the center is worked in another place for dimension stone

The primary crusher is a 30x42-in. Buchanan jaw crusher, which is set below the ground level at the foot of the incline that goes to the secondary crushing and screening plant. Skips are used to haul the crusher discharge up the incline and these discharge to a small hopper above the No. 7½ Austin secondary crusher. The remarkable thing about this crusher is the way that it is installed. It is set on concrete beams over a bin and the base of the crusher is some 60 ft. up in the air. There is some vibration when the crusher is fed light, but with a heavy feed the vibration is very little. While it is not considered good practice to set so large a crusher in this way, the results seem to justify a departure from the regular rule, as it has been running in that position for more than a year without any serious effect on either the machine or the building, so far as can be noticed.

At present the only screening is that required to remove the ¼-in. and finer size. The product of the crusher goes to a 48-in. by 18-ft. Austin screen, but all the sizes except the dust and the oversize of the screen go to the same bin. This product is flux stone used in the iron furnaces of Birmingham and Sheffield.

In the lower part of the plant is a second Austin crusher, a No. 6 machine. This is fed from stone which is hauled in from the quarry by wagons. The crusher product is elevated to the same screen as that which serves the No. 7½ crusher and the



The main crushing plant. The platform in front is for wagon delivery to the lower crusher

product of the No. 6 goes to the same bin.

In addition to the plant just described the company operates two small crushing plants which they call "wagon plants," since the stone is all brought in by wagons. These are of very simple design. The wagons haul the stone up an incline and dump it into the hopper of a No. 5 Austin crusher. The crusher product goes to a revolving screen which removes the screenings. The oversize, which is flux stone, falls directly into a railroad car and the undersize (screenings) falls into another car.

Mr. Bowers, the superintendent of the plant, says that these wagon operations pay very well, and that this is due to the kind of labor available. Skilled labor, such as is needed for running shovels and locomotives and keeping them in repair, is not very abundant in the South, while common labor, both colored and white, may be found easily. The men who load the wagons and drive them to the plants work on contract and make good wages, while the company gets its stone at a surprisingly low cost per ton, delivered in the hopper of the crusher. A further advantage is that there are no delays from waiting on the shipment of repair parts or the bringing in of skilled mechanics to make repairs, an expensive matter in an isolated situation such as these plants occupy.

To keep one of these small plants going requires six wagons and 12 men, and such a plant can produce from 100 to 125 tons per day. Three additional men are required to run the plant and look after the loading of the cars. The contract price for loading stone and hauling it to the crusher has varied, but is 40 cents a load at present, and a load averages 2500 lb.

The No. 7½ Austin crusher mentioned is a veteran with a record of service to be proud of. The company has owned it for 16 years and acquired it from a plant which had had some years of production before that. It has been through a fire and has been moved three or four times, but it stands up to its work as well as it ever did.

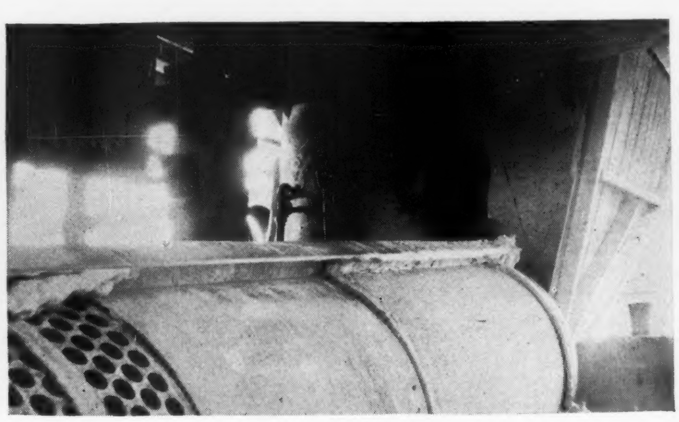
The crusher is set over the bin at the left of the house, 60 ft. from the ground

Rip-rap, one of the products of the quarry, is shipped in considerable quantity. The specifications call for stones weighing from 50 to 500 lb., and these are produced in a simple and easy way. Large blocks of stone are loaded on the railroad car by a derrick, and any pieces which are too large are broken by a little pop shot. A considerable part of the rip-rap shipped is waste from the dimension stone quarry, but some of it comes from the wagon plants where it is loaded on the cars by hand.

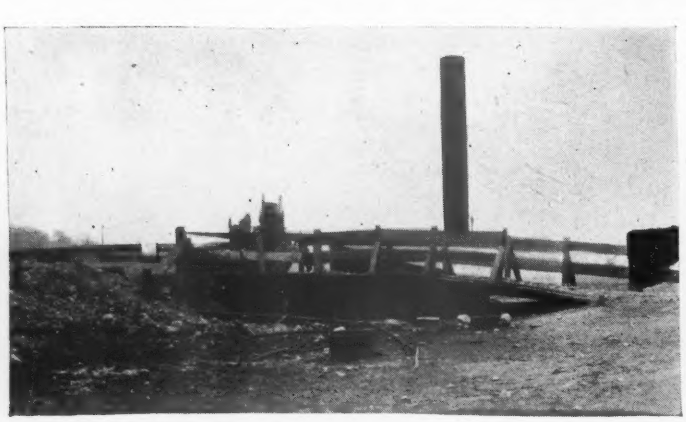
The dimension stone plant has the usual equipment of saws and lathes and is kept very busy, as the beauty of this stone causes it to be in great demand. It is what is known as a variegated stone, being streaked with a darker gray than the main mass, the effect being almost that of marble.

Sand from Spruce Pine, Ala., is used for sawing. It is a pale yellow sand almost pure silica, and to the eye it appears to be around 20-mesh in fineness.

The little village where the plant is located is six miles from Russellville, and it is called Rockwood. In appearance it reminds one of a Western mining camp, with



Left—Receiving hopper and grizzly. Right—Showing connection between screen and crusher



Left—Upper side of one of the "wagon plants." Right—Lower side of same plant showing how the products go directly to cars

the board houses standing in the pines, relieved by an occasional log house of an earlier date, and the company store as the center of everything.

Russellville, which is the plant's post office address, is a progressive town with 3500 inhabitants. It is situated in the Cumberland mountains, 20 miles from Sheffield and Florence, twin towns, which are becoming important from their nearness to the Muscle Shoals dam. There are iron furnaces in these places and much of the ore they use comes from Russellville, as does the limestone flux.

The dimension stone plant. Waste from this plant furnishes part of the crusher feed

At Russellville is the government quarry for limestone, which was to be used in the manufacture of nitrates at Muscle Shoals. During the war the Rockwood-Alabama quarry was taken over by the government and worked for limestone to be used at Muscle Shoals. Crusher dust from this quarry is still sold to the government to be used as fine aggregate in concrete at the dam.

The main offices of the Rockwood-Alabama Stone Co. are in Nashville, Tenn. A. D. Creighton is president, J. S. Dunbar is vice-president and W. F. Creighton is secretary-treasurer. A. T. Bowers is in charge of plant operation.

The company has opened a new quarry at Waco, near the government quarry referred to above.

Labors' Wages Up; Building Material Prices Down

IN the pressure of demand that characterized the first six months of 1924 and 1925, a demand that culminated at the end of each year in the successive smashing of construction records so far as volume was concerned, building material prices delivered on the job in New York City attained ever increasing heights, says a recent Dow Service Building Report, which continues: The question arises, therefore, why, if contract awards develops such a high volume in the first half of 1926, did not building material prices revert to the upward trend of the first half of 1924 and 1925 and go on up to new and dizzier heights?

The basic building material market as it now functions in the metropolitan district of New York is nearer an actual cost basis than it has probably ever been before. Competition for desirable business is getting keener and keener every day. If a buyer gets any kind of a cut in price on any building commodity he purchases today he is getting it either because he is buying in extraordinary quantity, the seller is cutting his own profit, or the buyer is getting short weight, short measure or short service or the material has been stolen.

Instead of pushing up prices in accordance with the increased demand for materials, equipment and appliances that has followed the heavy award of contracts within the first half of 1926, the tendency is to adjust costs to margins in such a way as to not scare the prospective builder out of the picture at a time when increase in wages were bound to jolt him somewhat in his determination to proceed.

That the increase in building trades wages has actually accomplished that result has already been seen by the 22.8% drop in projected building plans filed. Had building material prices risen to the point that at times demand seemed to have dictated, even the sustaining volume of contract awards would have shown a decline instead of an actual increase.

This is not a mere surface indication of a passing trend or wave or reform. It is genuine enough and permanent enough to command the attention of big business interests with the result that while construction in contemplation sees fit to wait, the building material interests are taking steps to get in line for the far more aggressive competition that is soon to come, not only between trade and trade, but between industry and industry.

A notable example of this is found in the incorporation on July 1 of the National Building Units Corp., recently organized by Charles R. Flint and Co. of 25 Broad street, New York City, a corporation capitalized for many millions of dollars, having 25,000 shares of 7% cumulative preferred stock and 350,000 shares of no par value.

According to Mr. Flint, whose agents have been studying the situation heretofore described from a national point of view, the time has come when the building public will be given ex-parte data concerning the best and cheapest material to specify in its building and the National Building Units Corp. will have a plan and scope that will give the prospective builder exactly the data he wants and will put service at his disposal in the matter of getting the material onto the job, honest of weight and quality and serviced by a company big enough to consider the buyer's needs over and above the seller's desire to market his stock.

Limestone Company Employes Secure Group Insurance

ACCORDING to a recent announcement by the Employes Welfare Association of the Pittsburgh Limestone Co., all employes of the company including the G. W. Johnson companies, with plants located in Pennsylvania, Maryland and West Virginia have the option of the group insurance policies of the Equitable Life Assurance Society of the United States.

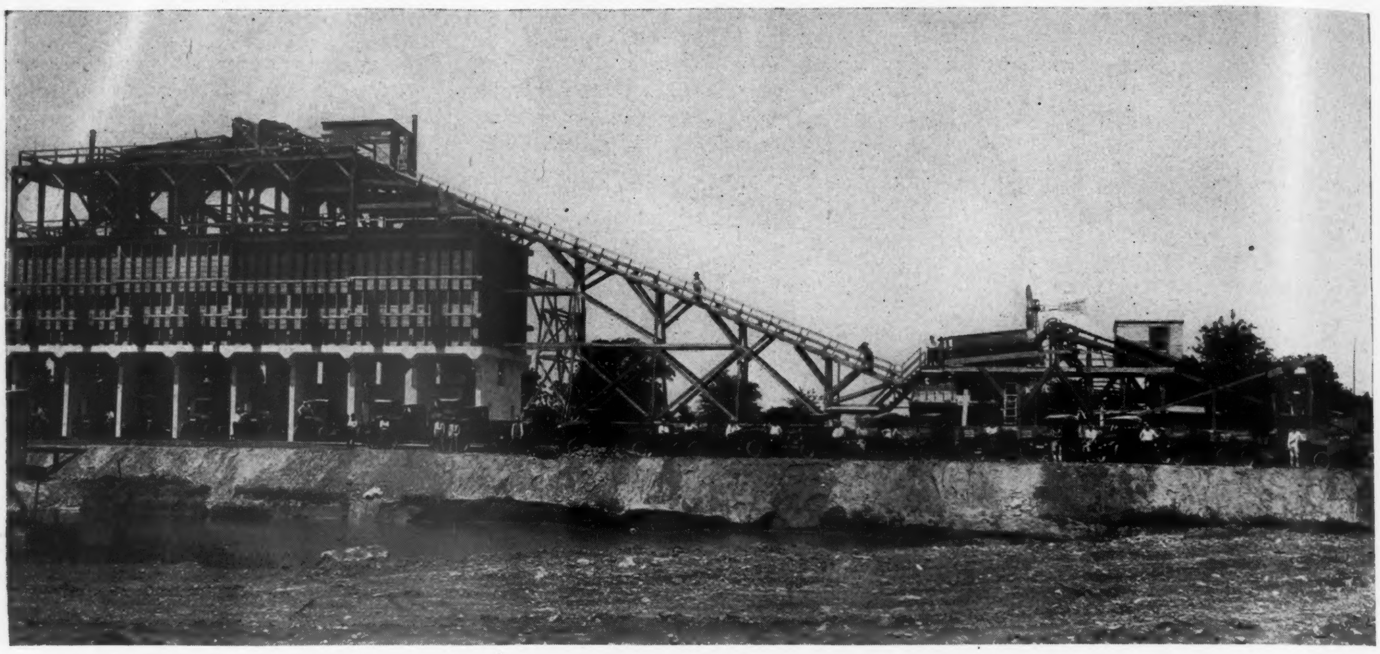
The policies became effective on June 29, 1926, and the employees had until July 15 to take out policies under this plan without any medical examinations, but after that time the employees taking out insurance are required to pass the examinations.

The companies were insured by M. J. Donelly, local agent of the Equitable Life Assurance Society, and the plan involves according to information about $3,000,000. The schedule includes all employees with salaries from $1,000 to $3,000 and over.

It is understood that about 2,000 men will be effected by this new group ruling. Officers of the company formed an active part in putting through the plan. The only requirement in the taking out of the insurance to the employees is that they must be members of the Employees Welfare Association. —*New Castle (Penn.) News.*

High-Alumina Cements

IN the article on high-alumina hydraulic cements published in the June 26 issue, the values of Al_2O_3 and Fe_2O_3 of the portland cement "E" (Table 1, p. 60) should have read Al_2O_3, 6.88% and Fe_2O_3, 2.25%.



General view of the big plant, with some of the delivery trucks

Making Gravel Aggregate to Order

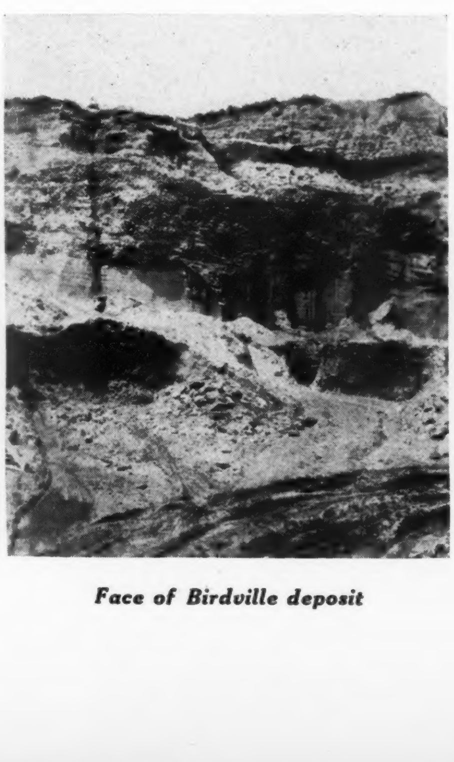
Fort Worth Sand and Gravel Company Has Unique Arrangements for Crushing and Mixing Sized Material

By J. W. Triplett
Fort Worth, Texas

THE latest unit added by the Fort Worth Sand and Gravel Co., Fort Worth Tex., is the largest and most modern gravel washing, grading and remixing plant in the southwest. Located in Riverside, a suburb of Fort Worth, it overlooks a large deposit of sand and gravel in an old river channel just north of the Trinity river (which divides the city). The company now takes material from three pits in the Fort Worth territory and operates two gravel washing plants and a central concrete mixing plant within the corporate limits of the city. These are the only large sand and gravel operations carried on in the Fort Worth territory, although several pits are turning out bank run material in a small way. In fact, the new Riverside plant stands over some old pits which, after being worked by pick and shovel methods for over a quarter of a century, have had their resources only scratched. Millions of tons of aggregate are yet to be taken from this deposit, which is one of the largest in Texas, a state comparatively poor in gravel.

The Riverside plant has a capacity for 3600 tons daily, and brings the washed gravel output of the company up to 4400 tons per day. It was built to meet the greatly increased demand for washed and graded aggregate in the city of Fort Worth and the surrounding territory, which includes a population of over a million. This year's building activities are running 50% greater than ever before and 100% greater than last year.

Users of aggregate formerly taking pit run material have been rapidly won over to a higher standard since the Fort Worth Sand and Gravel Co. installed its first washing plant in 1919. This older plant is a gravity screen washer of 800 tons capacity. The central concrete mixing plant was placed in operation in 1924 near this washer on the edge of the business district. Now with the big new plant producing since April, the company's service to users of concrete has been perfected according to the better standards of the sand and gravel industry.



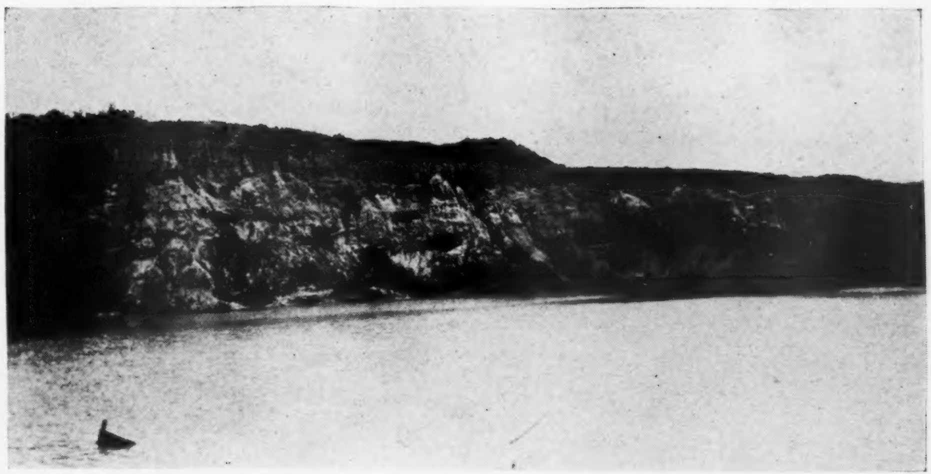
Face of Birdville deposit

An outstanding feature of the new plant is the remix process for concrete aggregate. By this process the various sizes of sand and gravel, after being washed and graded, are remixed in prescribed proportions to produce concrete of the greatest strength by laboratory test. Customers may order and receive the particular grading they desire and their most exacting demands are met. The Fort Worth Testing Laboratories report the pit-run aggregate around the city produces a concrete that breaks under a crushing test of 2500 lb. per square inch or less, and that concrete made with the "predetermined" aggregate from this plant stands a crushing test of 5500 lb. per square inch.

The bank material comes from three large pits. One is 53 miles south in Hill county, on the Missouri, Kansas and Texas Railway; one is 4½ miles east at Birdville, on the Chicago, Rock Island and Gulf Rail-

way, and the Riverside pit, which is also on the Rock Island, within the corporate limits of Fort Worth, and just about one mile east of the business district. Both the latter pits are in the switching limits of the city.

The Hill county pit turns out mostly road gravel and railroad ballast. The deposit is from 8 ft. to 10 ft. in thickness and has a light overburden averaging 1½ ft. Operations are carried on with a Pawling and Harnischfeger dragline, powered with a gasoline motor, having a 40-ft. boom and a ¾-yd. bucket, and a 60-ton Baldwin locomotive fired with oil. One mile of standard gage track is used. It is skidded by labor in sections whenever a change of location is made, which is the most economical method in this territory. Over 325 acres are worked in the Hill county pit.



Face of Riverside deposit, part of which is under water

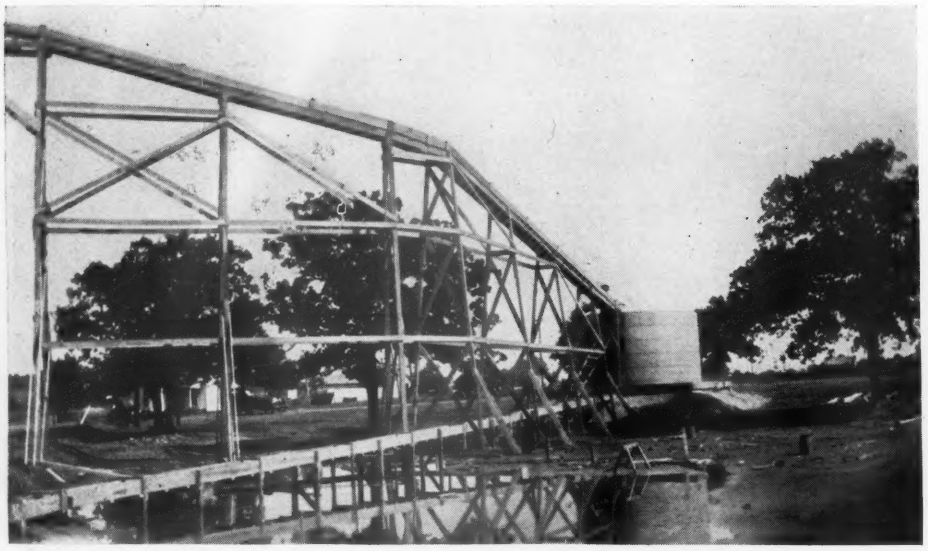
At Birdville the overburden averages 4 ft. and the gravel deposit 12 ft. Digging equipment consists of a Northwest dragline and a Bucyrus dragline. The Northwest has a 1-yd. bucket on a 50-ft. boom and is powered with a Twin City gasoline motor. The Bucyrus is a steam driven machine. It swings a 100-ft. boom and a 4½-yd. bucket. From boom to center casting is 20 ft., giving the bucket a swing of 240 ft. An interesting feature of this machine is that natural gas is used in the boiler for fuel from a pipe line nearby. This fuel is reported as cheap and very satisfactory. Land above the deposit is level. No fills are required to lay tracks, which are standard gage. Tracks in this pit are also skidded by labor. The deposit covers a strip ¾ by 1½ miles. Three and one-half miles of tracks are used.

Material is loaded on Western side-dump cars which are pulled by another 60 hp. Baldwin locomotive also fired with oil. Ballast for the railroads of the territory is loaded from pit run material at this operation.

At the Riverside pit different methods are demanded. The excavating is done without skidding the tracks, which go through the center of the pit instead of around the rim. The work is confined to a strip about 200 yd. wide and two miles long and two miles of track are laid the entire length of the deposit. A Bucyrus, class 24, electrically driven dragline is used in this pit. This machine is powered by a General Electric motor of 120 hp. The boom is 100 ft. long and the bucket has a capacity of 5 yd. Another Pawling and Harnischfeger dragline exactly like the one in the Hill county pit is used as well. There is also an Erie steam shovel of ¾ yd. capacity. All these machines have caterpillar traction. Gravel and sand are stratified and average 35 ft. in thickness with an overburden of from 4 to 8 ft. From 10 to 20 ft. of the deposit is found under water. An 80 hp. Baldwin locomotive pulls Western side dump cars to and from the plant. All the locomotives are oil burning.

Standard gage tracks lie on both sides of the Riverside plant and cars may be loaded or emptied on either track. Bank material is received in one large underground hopper, 15x27 ft. at the top, which is set between the tracks and has 120 cu. yd. capacity. An interesting feature of this hopper is the grizzly, made of 50 lb. steel rails. It was

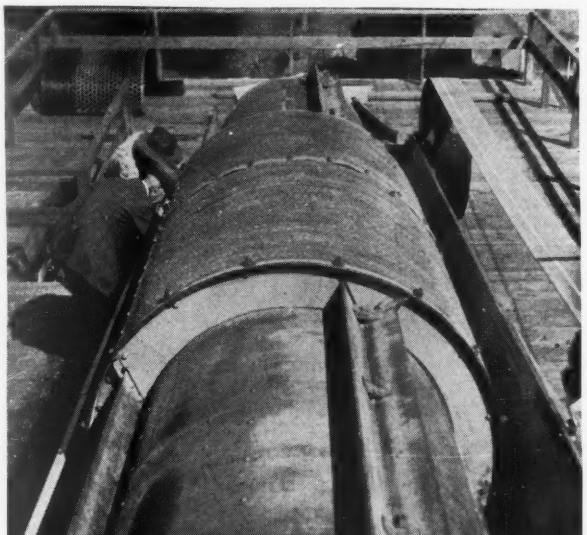
General view of concrete mixing plant and gravity washing plant



Settling tank designed by the company showing sluiceways to tank and back to storage bin

constructed with the idea of allowing trucks to drive on the hopper if necessary. The rails are inverted and set flush with the top of the 15 in. concrete walls of the hopper. The grizzly retains oversize greater than 4 in. There is very little of this oversize. It is reduced with a sledge hammer and sent in with the other material at convenient times.

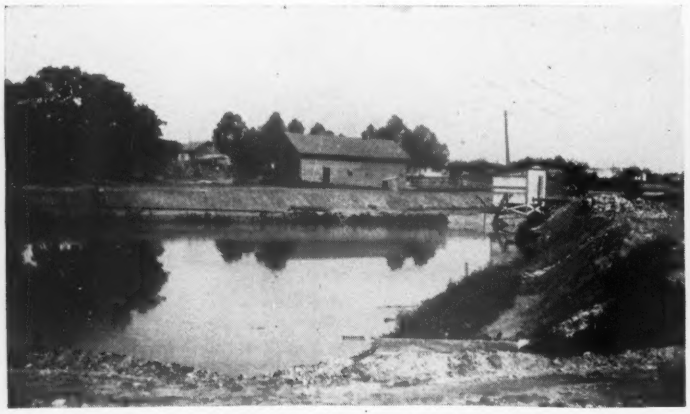
At the bottom of the hopper the material is distributed by a Telsmith plate feeder 24x 60 in. to a 24 in. conveyor belt having 103 ft. centers. Material is discharged from the belt into a rotary scalping screen 12 ft. above ground. This screen has an overall length of 12 ft. and is divided into three sections each 4 ft. long. Perforations in the first section are 1 in., in the second section 1½ in. and in the third section 2 in. Here is where the extreme flexibility of this plant begins. Normally oversize greater than 2½ in. goes to the crusher, but the chutes under the 1½-in. and the 2½-in. screens are divided and equipped with sliding and trap gates so that fines from either or both these screens may be sent through the crusher. By using these gates and chutes, material is sized 1-in., 1½-in. or 2½-in. down before going into the washing section of the plant. By opening the gates to the crusher under the second and third sections of the scalping screen everything over 1 in. goes into the crusher. Or the gate in the chute under the 2½-in. screen may be opened to the crusher and the gate under the 1½-in. screen opened to the conveyor belt sending only sizes under 1½-in. to the washer. This flexibility is the keynote of the entire plant.



Looking down on main screen from top of plant

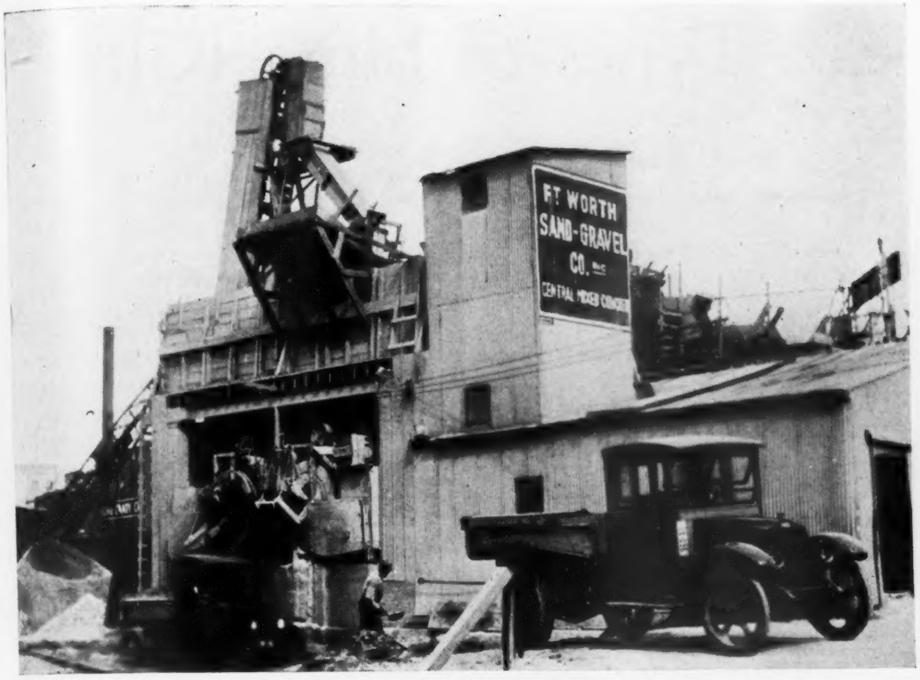
This discharge from the crusher is fed to a 16-in. belt conveyor, having 53-ft. centers, which runs in the opposite direction to the first conveyor and discharges on it, sending the crushed material again through the scalping screen. Fines from the scalper are fed to another 24-in. conveyor belt which has 153-ft. centers. It discharges at the top of the plant 56 ft. above ground into a mixing box where the material is met by an 8-in. stream of water and carried into the rotary scrubbing and grading screen. This screen has a length of 20 ft. and is 4 ft. in diameter. It has the following sections: 5-ft. scrubber, 11-ft. screen with ¾-in. perforations, 4-ft. screen with 1½-in. perforations and a sand jacket screen around the ¾-in. screen 9 ft. long and divided into two sections—a 5-ft. section having ⅛-in. and a 4-ft. section having ¼-in. perforations. Water from a 4-in. pipe plays on the material in the scrubber and ¾-in. screen to break up dirt and give the sand and gravel a thorough rinsing.

The fine sand and coarse sand go into separate chutes to Telsmith automatic sand settling tanks. Sand is recovered by the Telsmith method of automatic valves which open when the weight of the sand is sufficient and close before the dirt reaches the bottom. Water and very fine sand flow to a corrugated sheet iron tank on the ground by way of a long chute. This tank is the type ordinarily used for storage of oil, water, etc. It is about 10 ft. in diameter and 12 ft. in height. Separation is accomplished by gravity flow. The tank fills and overflows when the plant is running. The base of the tank is of concrete, which extends 18 in. out all around the bottom and has a rim raised about 6 in. to catch the overflow. This overflow water is carried by a 12-in. sluiceway to a culvert under the



Storage tank and pumping plant

Well and pump house



Central concrete mixing plant

conveyor and railways near the hopper and empties in the storage tank on the other side of the plant. It has an opportunity to clear by settling before being taken up by the pumping plant and sent through again. Sand comes out of the galvanized tank through a 2½-in. pipe at the level of the concrete rim and empties into a sump dug in the ground, which is red clay. Of course a great amount of water is discharged with the sand. The water is allowed to overflow into the same culvert leading back to the storage tank. The fine sand which settles in the sump is recovered by a clamshell after a few days' running has filled it to the top. It is sold for use as engine sand and similar purposes. This method of recovery for fine sand, which usually goes to waste, is wholly the design of the Fort Worth Sand and Gravel Co.

The chutes which carry the gravel and sand from the screens to the bins have adjustable gates and slides so that the smaller sizes may be thrown into the bins with the larger in any proportion which may be desired. The remixing is done to conform to the specifications of the architect, engineer or other customer. Or if the mixture is left to the judgment of the company the best aggregate that can be made for the work is sent, tests having already been made to determine the proportions best suited to various kinds of work. The ability to turn out "made to order" aggregate is found to have a strong influence in selling the company's products.

Rear of scalping and crushing sections in foreground

When strict grading is desired the gates are opened to the bins and opened or closed in the chutes so as to send each size to its separate bin. From the screen to the bins 16 ft. of headroom is necessary in order to allow for the arrangement of chutes, side-chutes, gates, etc. All the bins are 20 ft. high and 12x20 ft. in size except one sand bin, 24x20 ft.

City delivery trucks are loaded from chutes directly under the bins. Railway cars are loaded on the tracks at both sides of the plant. These chutes include one of the most interesting features of the washing given aggregate at this plant. A 12-in. section of the bottoms of the chutes is removed in each one and a ⅜-in. screen section is inserted. A final rinsing is given the material as it comes out by water being played on the gravel above the screen from ⅛-in. perforations in 2½-in. pipes. The water passes through a sluice back to the storage plant. This latter process is illustrative of the company's desire to turn out the finest products possible.

A well, an earthen storage tank and two pumping plants are the essential factors in the water supply system. The well is 15x 25 ft. It was dug out by a dragline and is right in the gravel deposit about 150 yd. from the plant. A concrete wall is planned for the well in the near future. There is no lack of water, as the Trinity river is only about 250 yd. from the plant, and could be utilized in case a very dry season curtailed the supply. A 4-in. Gould centrifugal force pump sends the water through a 4-in. line to the storage tank at the plant, raising it about 25 ft. This first pump is operated by a 20 hp. General Electric motor. From the earthen storage tank, which is 10 ft. in depth and has an average circumference of 35 ft., the water is lifted by an 8-in. Gould centrifugal force pump driven by a 50 hp. Westinghouse motor. The water is delivered by an 8-in. pipe to the mixing box and it is from this pipe that the pipe is fed which carries the final rinsing spray delivered in the chutes.

All the power used at the plant is furnished by electricity. There are three motors in addition to those driving the pumps. A 25 hp. Wagner motor turns the conveyors leading from the hopper and the crusher. The crusher is powered by a 50 hp. Westinghouse motor. The long conveyor belt and the scrubbing and grading screens are driven by a Wagner motor of 50 hp.

It is interesting to note that storage of material is practically eliminated by the capacity of the plant to reduce all sizes to under 1 in. It is never necessary to store the larger sizes of gravel. When not in demand they are reduced to the size desired. Occasional over supplies of sand are stored in a cleaned out section of the pit. Costly rehandling charges are avoided, yet the customer gets the exact blend or size he prefers.

The Smith Engineering Works of Milwaukee are the designers of the plant. They also furnished most of the equipment. Where credit is not otherwise given in this article Telsmith equipment is in use.

The other two plants of the company, the gravity washing and screening plant and the central concrete mixing plant, are located on the Rock Island railway close in to the business district of Fort Worth. The older washing plant is now used as an auxiliary producer when the demand is for more than the new plant can supply or when the nature of the orders makes the use of the smaller plant more economical. It is also of Telsmith construction. Daily capacity is 800 tons.

The central concrete mixing plant is capable of turning out 600 cu. yd. of ready mixed concrete per day. Two Ransome mixers of 1 yd. capacity are used. Aggregate is elevated by a 60-ft. Telsmith bucket elevator equipped with buckets 9x7 in. Cement is carried up by two belt elevators. Screw conveyors take it into the mixers. Seven men are required to run the mixing plant when both mixers are in use and four men when only one is running. Nearly all the concrete for local flat work comes from this plant. Its operation has previously been more fully described in a previous issue of ROCK PRODUCTS.

Some European Types of Lime Kilns

By H. Halbig

Translated from *Tonindustrie-Zeitung* by Margaret Arronet Corbin

Every lime manufacturere is continually striving to reduce his cost of production. Primarily he is interested in reducing his fuel costs, and as a consequence, in planning new installations he will select a type of kiln which not only will give the highest fuel ratio, but which also permits the use of a cheaper and usually a lower grade fuel.

His other attempts will be directed towards reducing the cost of labor by the use of automatic devices. The lime industry today numbers several types of kilns which apparently satisfy these requirements.

The relative advantages of different methods of firing will be considered below. The selection of fuel will be discussed further, followed by a description of certain types of kilns appearing as outstanding due to their high production, low fuel consumption and labor-saving devices.

Lime is now burned almost exclusively in ring or shaft kilns, which may be fired with solid fuel introduced directly into the kiln. Both types of kilns, however, are equally adapted to gas firing, i.e., injection of natural or producer gas. The shaft kiln is particularly adapted to gas firing, due to its relatively narrow cross section. Though the ring kiln may also be successfully operated with gas, solid fuel is still the predominantly used fuel for this type of kiln. Gas has several advantages over coal, particularly in the case of the shaft kiln. As a result of this, shaft kilns today make almost exclusive use of this type of fuel. The following advantages are claimed for gas fired kilns:

Gas-Fired and Coal-Fired Kiln Compared

Kilns of smaller dimensions yield the same output, thus reducing the cost of construction.

The firing of different kilns may be centralized in a central gas plant, thus reducing the cost of labor.

By varying the proportions of gas and air, by mixing these two substances before admission to the kiln, by gradual addition of air to the gas, and by varying the pressure and velocity of the gas and air, different conditions may be produced within the kiln.

The air supply may be strongly preheated, and thus bring about a considerable reduction in the amount of fuel that is required.

The lime made is free from impurities.

A considerable reduction in fuel consumption is achieved; as the fuel consumption of a coal fired kiln is 20-30%, while that of the gas fired kiln is only 8-10% of the charge.

Direct coal firing of shaft kilns has many disadvantages which decrease its desirability:

Whenever the layers of fuel become too thick, which is easily possible through carelessness of the operator, the air supply ceases to be uniform; only partial combustion of the fuel takes place, and a part of the unburned fuel is removed with the burned lime.

The volatile constituents of the fuel are easily driven off and escape into the air when there is an insufficient air supply for combustion.

There must be always an excess supply of air; consequently, the air is only partly preheated and a reduction of the temperature of combustion results.

Direct coal firing results in the formation of gases with a high CO_2 content, while producer gas has a high CO and H content.

Types of Gas Used

The gas-fired kiln is used in nearly all large modern lime plants. The gas used may be the product of complete or partial combustion, or may be natural, furnace or coke oven gas. Complete combustion of the gas requires a large supply of air. The gases enter the kiln at their high temperatures upon being mixed with sufficient preheated air to insure complete combustion. The gas producer of the partial combustion types admits only sufficient air to form CO. The gas is then admitted to the kiln upon being mixed with preheated air, causing combustion to take place within the kilns. Experience shows that the latter type of gas producer is to be greatly preferred to the former.

The question frequently arises whether it is advisable to build separate gas generating units for every kiln, or whether these should be localized in one central gas plant away from the kilns. The advantage of building gas producers as units with the kilns is that the gas then enters the kiln at a temperature of 400-600 deg. C. The use of this method of construction is advisable only in smaller installations with ordinary gas producers burning a coal with low moisture content. A central plant is to be preferred in large plants. The use of simple built-in producers would not be efficient here, as their operation and stoking would require excessive labor. Automatic stokers should be used for furnaces of large capacity. When coal is used, the gas plant should not be too far from the lime kilns, so as to reduce the length of the gas distributing system. In long pipes, the coal gas may leave deposits of tar in cold weather, due to the cooling effect. Adequate insulation should be provided to prevent this occurrence.

When lignite or peat gas is used, a separate gas plant is always more desirable, for the following reasons:

Both lignite and peat have a high moisture content, that of the former running around 60%. To prevent the lowering of kiln temperature by the evaporation of the moisture present in the gas, it is necessary to drive off this moisture before the gas enters the kiln. The combustion temperature of gas, when free from moisture, is about 1600 deg. C.; when containing moisture, 1200 deg. C. The temperature of lignite gas, when free

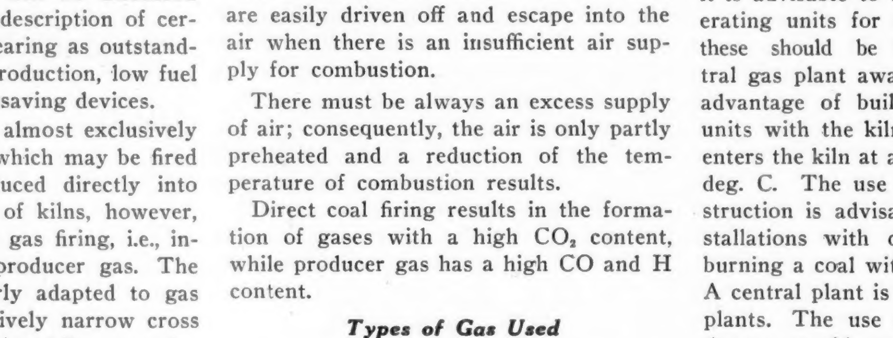


FIG. 1

from moisture, is sufficiently high for lime burning. To give the moist gases a chance to lose their moisture before entering the kiln, they are made to pass through a water separator.

In ordinary gas producers with water seal and central blast and steam supply, an ordinary boiler coal with up to 15% ash may be reduced to gas. In using lignite, particular attention should be given to the size of the lumps. When peat is used, dense layers are formed in the producer and the air cannot penetrate to all parts of the furnace at the required rate. This results in a considerable reduction of output. Good results may be obtained with lumps of 6 to 9 in. in diameter. A better method is that of using briquets, as the moisture content of the fuel is thus reduced from 15-20%. These briquets, having an average heat value of 1400-1500 W.E.,† are very well adapted to the heating of lime kilns.

When automatic stokers are used, boiler coal with 30% ash may be used advantageously.

Efficient Gas Producers

In general, it may be said that every type of gas producer is adapted to heating a lime kiln. Even the old Siemens producer is still frequently encountered today with natural or forced draft. It has the disadvantage of not being equal to heavy demand. Some types are simple vertical furnaces with central air and steam supply. The latter prevents the baking of the clinkers and produces relatively large quantities of hydrogen which improve the quality of the gas. All grades of fuel may be used in this type of a producer.

The best and most efficient producer is that provided with automatic stokers, as they effect considerable saving in labor. In large plants this item acquires greater and greater importance and speaks in favor of the automatic stokers.

The Modern Lime Kiln

The cross section of the modern gas-fired shaft kiln may be circular, oval or rectangular with rounded corners and a built-up core at the center. The latter system generally consists of several units, the kilns being built side by side, connected by one common wall of masonry. The kilns are built in two rows with lime chutes facing one another. The lime is transported on tracks laid between the rows of kilns.

Fig. 1 shows a lime kiln installation of this type, of which several have been actually built and are operating successfully. These kilns have as a rule a daily capacity of 25 tons of burned lime. Their fuel consumption, when coal gas of about 6500 W.E. is used, is 17-19% of the output, or 8-9% of the limestone charge. The installation consists of four kilns, of which each two are connected at the top. Their cross section is rectangular with rounded corners and slightly widened at the center. The gas producers have also a rectangular cross section and are provided with plane grates with oval openings for admission of air. They also have a water seal. Stoking proceeds from two sides. The producers receive a blast of 450 mm. W.S., which is admitted below the grate. Steam is also admitted below the grate. The coal feed consists of a conical hopper. For better control, repairs and cleaning, the gas producers are provided with doors. The coal reaches the producers on tracks running along the kilns. A narrow-gage track is also provided in the pit for removal of ashes.

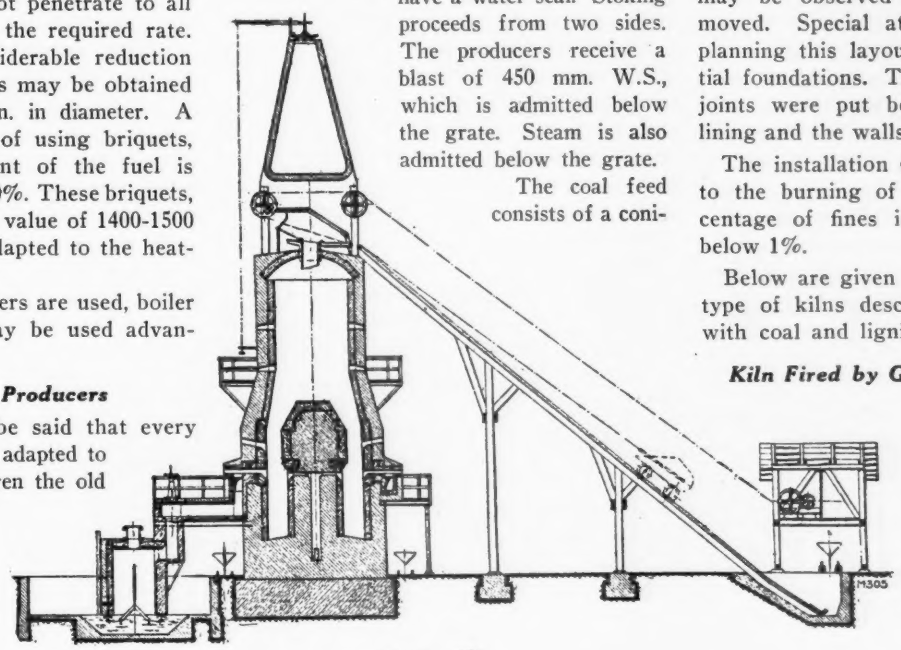


FIG. 2

Kiln Types

This type of kiln is adapted to all types of heating. The kiln shaft is substantially built and tapers towards the top. A gas distributing system is located in the burning zone of the kiln. The producer gas enters the flues at its own temperature and passes into the kiln through uniformly spaced valves, first being mixed with a definite amount of air, which is preheated inside the kiln and producer walls to a temperature of 250 deg. C. Most of the air supply, however, enters the kiln through the cooler, where it is preheated by the burned lime, serving to cool the latter before being mixed with the gas entering the burning zone. At the lowest point of the ascending gas flues a common pipe is provided to carry off the moisture contained in the gas and the tar. Each kiln has two charging openings reinforced by steel frames and operated by means of levers. Between these is the stack, with a regulating valve permitting the escape of waste gases. The limestone charge is fed by electrically driven elevators. The lime is removed through four doors in the lower part of the kilns. It slides along an inclined chute provided with a separating screen into the cars standing below. The fines fall through the screen into the cars on the narrow-gage track. To facilitate operation, control openings are located along the longitudinal dimension of the cross section. Peepholes are provided at different levels through which the processes may be observed and obstructions removed. Special attention was given in planning this layout to provide substantial foundations. The required expansion joints were put between the refractory lining and the walls of the kilns.

The installation is particularly adapted to the burning of lump lime. The percentage of fines is very low, generally below 1%.

Below are given production data of the type of kilns described, when operating with coal and lignite respectively:

Kiln Fired by Gas Made from Coal

Limestone charge per kiln per 24 hours	40 tons
Lime output per 24 hours	22.5 tons
Coal (heat value)	6300 W.E.
Coal consumption per 24 hours	4-5 tons

The fuel consumption is thus 18% of the output or 10% of the charge.

Kiln Fired by Gas Made from Lignite

Limestone charge per kiln per 24 hours	40 tons
Lime output per 24 hours	22.5 tons
Lignite (heat value)	2200 W.E.
Lignite consumption per 24 hr.	13.5 tons

The fuel consumption here is 60% of the output or 34% of the charge. The volume capacity in both cases is equal to 75 cu. m. and the period of calcination is 75 hours. It is evident that despite the low heat value of lignite its heat units are used up satisfactorily.

Another type of kiln is a kiln with round cross section and a built-up "core" at the center. This kiln has also given good results in practice. It is shown in Fig. 2. This installation is generally planned for a daily output of 28-30 tons and is particularly adapted to a charge whose lumps do not exceed over 9 in. in diameter.

As shown on the illustration, the kiln is provided with automatic feed. The car located in the pit is loaded from the tracks immediately above. It is then raised mechanically and discharged automatically, returning to its original location. A conical hopper is provided at

†W.E. designates Warmeeinheit, or one metric thermal unit. It is the kilogram-calorie and equals 3.968 B.t.u.

the charge to permit uniform distribution of the limestone in the kiln.

The kiln has a built-in core at the center made of refractory brick through which the secondary supply of air is admitted to the kiln. The air is preheated by the brick to a temperature of 250 deg. C. The gas is admitted from the producers through a distributing system after its dust content has been allowed to settle. It enters the kiln through uniformly spaced valves upon being mixed with the primary air supply, which is preheated by the masonry to 150 deg. C. Burning proceeds with extreme uniformity and the efficiency of this kiln is very high. From the point of view of operating cost, this type of kiln appears more favorable than the one described before.

Built-in Core Stores Heat

The special advantage of the built-in core is that it is a heat storer. The lime is drawn through six doors located at equal intervals. A narrow-gage track runs around the kiln along which the burned lime is transported. The blast is regulated by a valve located at the bottom end of the stack, which is operated from below. Peepholes are provided at different levels to observe the operation of the kiln and to remove possible obstructions.

This kiln has three gas producers with square cross section, conical feed, water seal, plane grate and central blast and steam supply. The blast pressure is 450-500 mm. W.S. The producers operate successfully in spite of the high ash content of the coal. Steam prevents the formation of clinkers. Two producers are in constant use while the third is being cleaned.

In using a high grade coal of about 6200 W.E. the coal consumption amounts to not more than 18-19% of the lime output. As the kiln has a daily output of 28-30 tons, the coal consumption is not higher than 6 tons per 24 hours.

Large Automatic Kiln

A similar installation of considerably greater capacity, producing 70-75 tons of lime per 24 hours, is shown in Fig. 3. The kiln is exceptional for a shaft kiln as to dimensions and production. The height of the kiln proper is about 25 m. (about 83 ft.) and the diameter of the shaft area is 6 m. (about 20 ft.). No chimney is provided here; the waste gases are removed by suction, as it is planned to recover the carbon dioxide. The limestone is brought to the kiln on a double electrically driven elevator, which serves two kilns and is used for passenger service as well. The rock has a diameter of 80-200 mm. (3½ to 9 in.). A conical feed is located at the center of the charge opening and is balanced by counterweights. Drawing of the kiln proceeds automatically, as well as transportation of the lime. At the bottom of the cooler are provided six automatic draw shears for discharging into cars passing below. These cars are in continuous operation, running without interruption under the lime chutes, collecting their contents and discharging them automatically into an elevator pit. The drawing of lime thus becomes a continuous operation.

So far, shaft kilns using gas as fuel have never been built of such dimensions. Special attention was therefore given in planning this kiln to provide adequate heating facilities. The gas is generated in a gas producer whose shaft diameter is 3 m. long and which is provided with automatic stoking devices. The gas passes through a dust arrester with a baffle and flows from here to the distributing system around the circumference of the kiln and in the built-up core as well, so that double heating results. Both gas supplies are easily regulated and are independent of each other. Both are in constant use during operation. The gas valves of the kiln and of the core are located at the same level, have a radial direction, and receive a small quantity of air preheated in the kiln or core masonry to about 100-300 deg. C. The main supply of air, which is preheated in the cooler, is admitted to the kiln through six air openings. A sufficient number of peepholes are provided at different levels to insure easy observation of the kiln operation. These are easily accessible, as several ladders are provided for this purpose. As mentioned above, the waste gases are removed by suction, the different branches of the suction system being built into the kiln. It is intended to recover the carbon dioxide of the waste gases in the future.

The gas producer with a capacity of 22 tons of coal per 24 hours operates with a blast of about 450 mm. W.S. The fuel consumption of this kiln is extremely low, amounting to only 13-15% of the output when coal of 7000 W.E. is used. The heat of the waste gases is recovered in preheating. The limestone thus reaches the burning zone at an already high temperature. This is the main reason for the relatively low fuel consumption.

The kiln described above is the property of the Panstwowa Plant Zwiakow Azotowych in Chorzow, Polish Upper Silesia (formerly the state nitrogen plant), where it is located.

The construction of this kiln was planned by engineer F. Zaleski of the above plant. The dimensions of the kiln and certain structural features were worked out in cooperation with Director Paulus, Mathias Paulus Co., Design and Operation of Industrial Plants, Katowice, Ul. Slowackiego 13, and with his chief engineer, the author of this article.

The capacity of this kiln was planned at 75 tons of lime per 24 hours. Four weeks after its installation, the kiln had already attained the production of 75 tons per 24 hours. It is to be expected that its production may be raised to 80-90 tons.

The expectations of the performance of this kiln were fully realized.

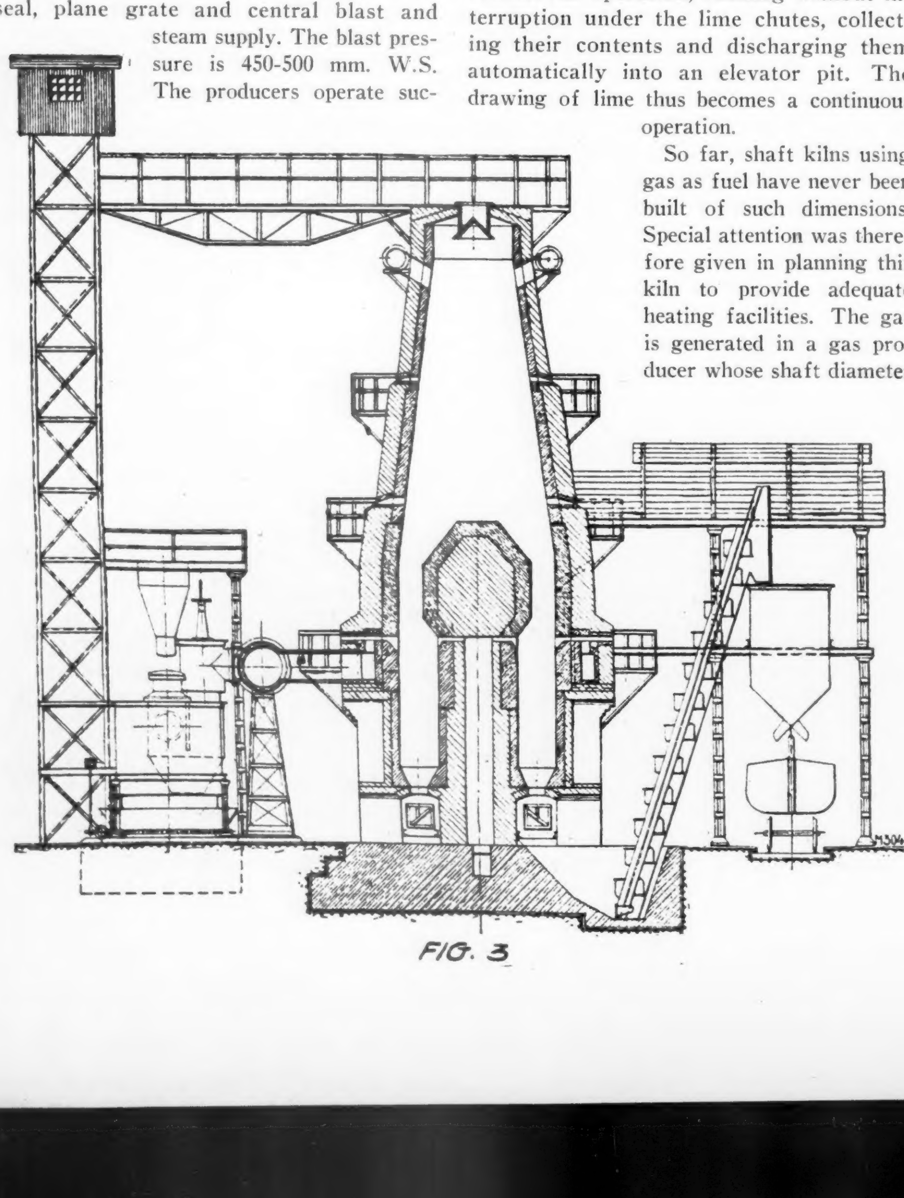


FIG. 3

New Lime Manager

THE Western Lime and Cement Co., of Milwaukee, Wis., announces that B. B. Williams has been appointed general manager of the company. Mr. Williams was formerly president of the old Marble Head Lime Co.

E. E. Long of Springfield, Mo., it is announced, is to be plant superintendent.

Oolitic Limestone at Bowling Green, Ky.

Interesting Geological Formation Worked for Many Years by Bowling Green Quarries Co.

By Joseph K. Roberts
Vanderbilt University, Nashville, Tenn.

THE oolitic limestone quarry six miles southwest of Bowling Green, Warren County, Kentucky, is now operated by the Bowling Green Quarries Company, the eighth company to operate it since the opening of the ground a little over 90 years ago. It was first operated by a Mr. Needham, about 1833, and the companies following this first one are Belknap & Dumerdiel, White Stone Quarry Co., Bedford-Bowling Green Quarry Co., White Stone Quarry Co. of Kentucky, Kentucky & Tennessee Stone Co., and Bowling Green & Green River Co. The oolitic stone is known widely over the Mississippi Valley and especially throughout Kentucky and Tennessee for its high degree of beauty, color, texture, satisfaction of working, strength and durability.

The quarry in operation at present is located on one of the typical hills of the region, which relieves the operator of the problems of excessive overburden and ground water. The limestones of the region are honeycombed with caves and the surface shows many sinkholes, some of which are unusually large. The region around the quarry has an average elevation of approximately 550 ft. and the quarry is about 200 ft. above the surrounding country. The region is well drained by the Gasper river and its system of tributaries.

The oolitic limestone of the Bowling Green Quarries Co. comes from the basal Chester formation and is therefore Mississippian in age.

It is regarded as a member of the Gasper oolites as suggested by Butts.[1]

[1]Butts, Charles: Descriptions and Correlations of the Mississippian Formations of Western Kentucky. Kentucky Geological Survey Report, 1917, p. 64.

The Gasper oolite is well marked, and, being underlain by the Big Clifty sandstone, which is very resistive to erosion, it can be traced as suggested by Crump.[2]

There are a number of limestone beds exposed in the quarry and the oolitic stone quarried comes altogether from one bed. Three workable beds of the oolitic limestone are known and there are others in the Gasper, and the oolitic stone is the outstanding type in the entire series. A section exposed in the quarry is as follows:

[2]Crump, Malcolm H.: The Oolitic Limestones of Warren County, Kentucky. Kentucky Geological Survey Report, Ser. IV, Vol. I, Pt. II, 1913, p. 1037.

Hoisting blocks for loading on cars

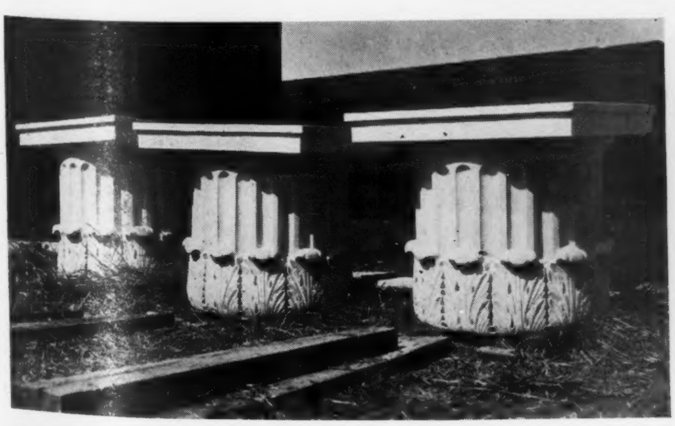
Overburden

Soil, red to brownish red, weathered from the limestone	1—5 ft.
Limestone, soft, yellowish gray, few fossils, well bedded, frequent hollow cavities lined with calcite crystals, which are coated by a black viscous petroleum residue	20 ft.
Limestone, hard, gray to grayish blue, very compact, few fossils, streaks of calcite, excellent bedding planes, and conformable at both limits	6 ft.
Limestone, soft, yellowish gray to yellow, abundant stylolithic structure, fractures filled with iron stains and abundant fossils	2 ft.
Limestone, dark gray to blue, siliceous near base, stylolithic structure abundant, cavities with petroleum coated calcite crystals and few fossils	22 ft.

Oolitic Bed

Oolitic limestone, homogenous texture, abundant small fragments of fossils, occasional stylolithic structure, very little jointing or bedding planes, and small areas of calcite crystals	20 ft.
Sandstone, light to yellowish gray, very fine texture, highly indurated, few fossils, sharp contact with the limestone above, and exposed in the quarry	2½ ft.

The 50 ft. or thereabouts overlying the oolitic bed is removed by blasting in small shots with black blasting powder and 40% dynamite. This waste material meets the requirements of road metal, concrete aggregate and ballast. The amount has been less in times past than now and 50 ft. is about the maximum in this quarry. With the increased



Capitals of a series of capitals made in dressing plant

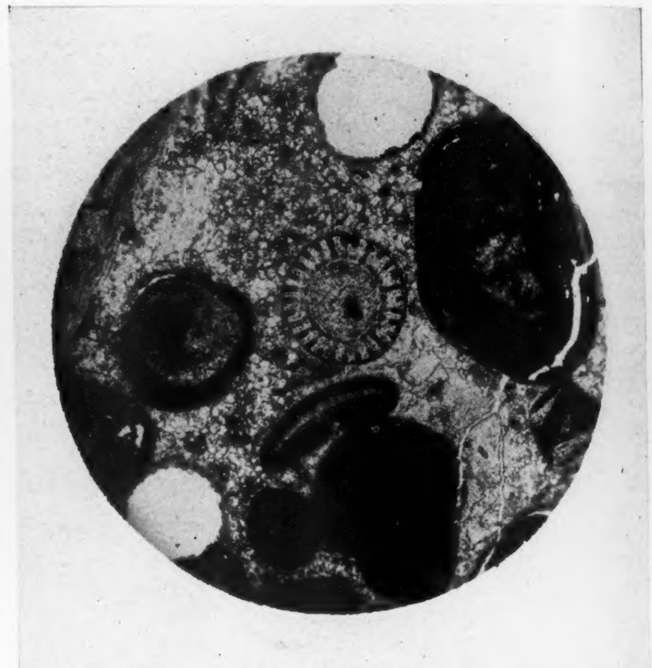
Lathe with 12-ft. column before fluting

demand for road metal and ballast there will be an opportunity for the company to dispose of most of this overlying material which at present is removed at considerable expense.

Character of the Oolitic Stone

The oolitic bed in the quarry lies approximately horizontal and maintains a uniform thickness of 20 ft. The beds of the overburden are of the same general strike and dip and all are apparently conformable, except the superjacent bed of the oolite. The matter of bedding planes in the oolitic stone is not an important feature in the stone at all, but in some of the blocks which have weathered for long periods of time, these planes show in some of the buildings. What few joint planes that occur in the oolitic limestone are so far apart that they offer no difficulty in quarrying and dressing the stone.

Microphotograph of a concentric oolite with a calcite center and in a calcite matrix (magnified 120 diameters)



Microphotograph showing a radial oolite with a center of no particular arrangement and a calcite matrix (magnified 120 diameters)

Fracturing is not very frequent and often when it occurs, iron stains fill such openings and blocks containing these are discarded because of the streaking which is liable to result if the stone is placed in a building.

The texture of the oolitic stone is rather homogeneous. The constituents of the stone are the small oolites, scattered fragments of bryozoa, gastropods, blastoids and other fossils, and small streaks of calcite. These calcite masses attain as much as 6 to 15 in. in size, and the individual calcite crystals may attain as much as 1/3 in. on the edge. The masses of calcite are objectionable in cutting and dressing the stone, as they are harder than the oolites and shatter under the saws and dressing tools.

The unique feature of the oolitic stone though not so frequent, is the "stylolithic" structure. The structure, commonly called "crowfoot" by the quarrymen, runs transverse to the oolite bed in a very few cases observed and mostly parallel to the bed and attains a width of 2 in. at times, though usually much less. It is objectionable except in those cases where the architect calls for off-grade stone. This structure carries iron stains and probably dark organic pigment and is very noticeable on a smoothed surface. It does not detract from the strength of the stone seriously, for in some of the crushing tests the stone breaks in the homogeneous oolitic portions first. The structure is becoming somewhat popular for interior work and some very pleasing patterns may be made from it.

Dressing plant with overhead cranes

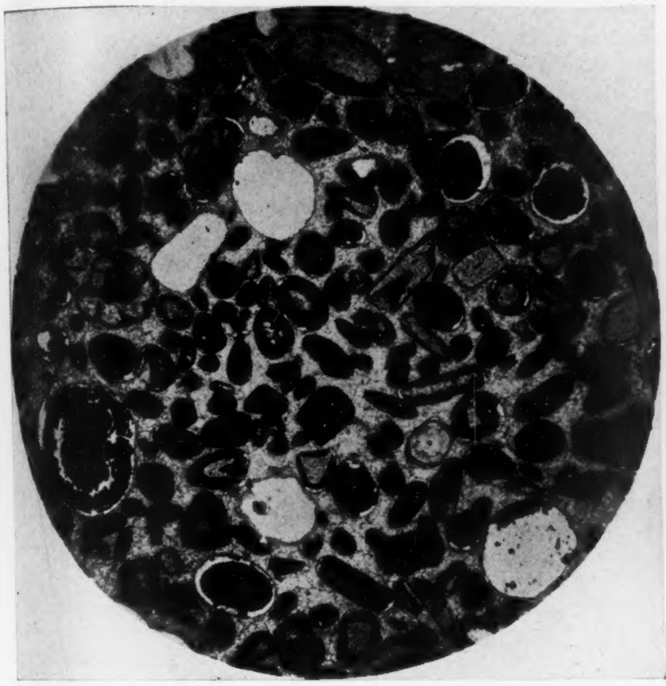
When the stone is free from joint and bedding planes and stylolithic structure, it breaks equally in all directions, and it may be placed in a building without regard to the position it occupied in nature. This fact was brought out years ago by Gardner[3] and others.

This stone is not brittle when taken from the quarry but rather tough and in this condition is it very easy to cut and dress. It weathers uniformly wherever it has been used in buildings and the rate of erosion is very low. After the stone dries, it becomes hard and brittle.

The color of the freshly quarried stone is a medium gray and upon drying it assumes a light gray to almost white color. Some portions of the stone are quite dark when quarried and some are almost black. This dark color is due to the presence of petroleum of a paraffine base, which, upon ex-

[3]Gardner, J. H.: Oolite Limestone at Bowling Green and other places in Kentucky. U. S. Geological Survey, Bull., Contr. to Econ. Geol., No. 430, 1909, p. 374.

posure for a period of a year or so, greatly reduces and in most cases wholly disappears. The petroleum is disseminated through the stone and not in cavities. Many of the blocks which have been discarded in the quarry are bleached to a light gray to white color, and this is the same that has been observed with the stone in buildings and monumental structures. When a white surface block is broken, the bleaching is found to extend only a short distance within, usually less than ½ in. The petroleum filling, or partially filling, the pores of the stone certainly does not add to its weathering, but probably adds to the exclusion of the moisture and thereby adds to the life of the stone.



Microphotograph showing typical oolites in a calcite matrix; a foraminifera in cross-section (magnified 20 diameters)

Microphotograph showing contact between oolitic bed and overlying silicious limestone, and the erosion of the oolites (magnified 20 diameters)

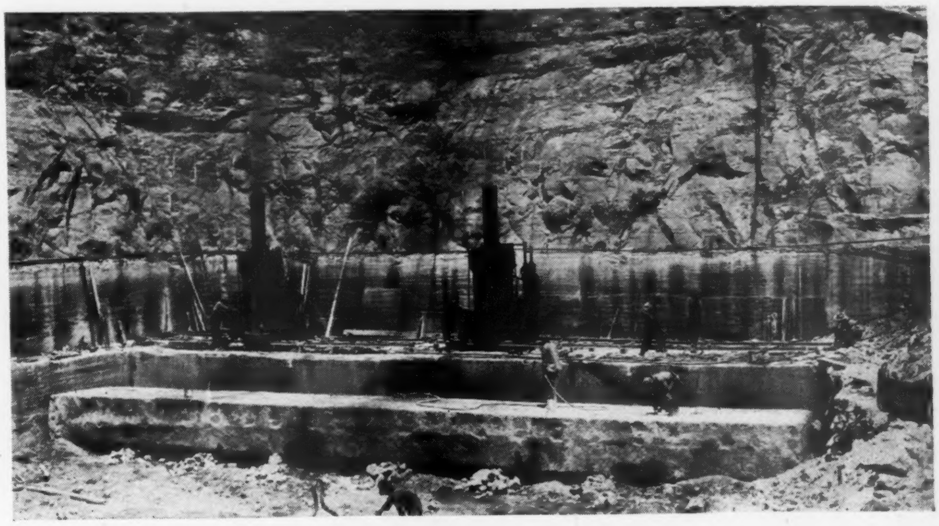
The Microscopic Character of the Stone

The outstanding constituent not only to the unaided eye but microscopically is the oolites. These oolites vary in size from 0.2 to 0.8 m.m., the average being around 0.5 m.m. The shapes are spherical and oval, the greater portion being oval. Concentric and radial structures occur and the former are more prevalent. Some of the oolites are entirely concentric and some entirely radial and still a few show both structures. Most of them have a center of no particular arrangement and a concentric or radial structure or both outside this center. Sometimes the centers show a nucleus of organic matter, a fragment of bryozoan, gastropod or some other fossil, or a grain of calcite. Several oolites show centers of calcite resembling a dumbbell. The concentric layers have differently colored bands or shells and sometimes the layers are separated from each other. The radial structures appear like the spokes in a wheel. Hollow centers are quite common, some of them circular in cross section and others angular, suggesting that solution may have removed the interior. Very probably the purity and the condition of the material in solution when the carbonate of lime was being deposited by organisms controlled the radial and concentric structures as has been suggested by Schalle[4] and Bucher.[5]

The bryozoa appear in thin sections as perforated bodies after very definite patterns and range from the sizes of the smallest oolites up to ¼ in., and they constitute the principal fossils. The gastropods are either coiled in one plane or are spiral, and the spires are tall and symmetrical, numbering from two to seven whorls. Cross sections of brachiopod valves and blastoids appear in the thin sections.

The matrix is very fine grained calcite with variable amounts of organic matter. It is rather significant that the calcite crystals have not ruptured the walls of the oolites in their growth. When the stone is broken it breaks around the oolites and not across them. Many of the calcite crystals are well formed and show twinning. On treatment with acids most of the stone dissolves, leaving a very little residue of silica and organic matter with other constituents.

There are a number of analyses of the



Channeling machines which cut out long blocks

[4]Schale, Heinrich: Zur Enstehung der Harnsteine und ahnlicher konzentrisch geschichterer Stein organischen und inorganischen Ursprung. Zeitschr. fur Chemie und Indus. der Kolloide. Bd. IV. 1909, Ss. 175-180.

Ueber Konkrementbildungen beim Vorgang der tropfigen Entmischung von Emulsionskolloiden. Kolloidchemische Beihefte, Bd. I, 1910, Ss. 375-390.

[5]Bucher, Walter H.: On Oolites and Spherulites. Journal Geol., Vol. XXVI, 1918, pp. 593-609. 593-609.

Bowling Green stone and of the Bedford oolitic limestone, which is very similar in many ways. The most recent analysis[6] is as follows:

Loss at 105 deg. C. for 1 hour	0.12%
Insoluble siliceous matter	0.88
Iron oxides and alumina	0.72
Calcium carbonate	96.88
Magnesium carbonate	1.33
Total	99.93%

Specific gravity, 2.601.

In the various analyses given in reports of the Kentucky Geological Survey, the lime content is high and magnesia low. The silica and alumina are not items that will interfere with the waste product being used for agricultural lime and certainly not high enough to make any material difference in the cutting and dressing of the material.

The crushing strength is very high, far higher than is required in the average buildings and the average is well over 6000 lb. Three tests on the stone have been recorded by Crump[7] and these are 6532, 7009 and 6746 lb. per sq. in. The weight of the stone varies from 150 to 165 lb. per cu. ft.

Quarry Methods and Equipment

The upper strata are stripped off by drilling and blasting. The oolitic bed is cut by a channelling machine into blocks which measure 64 ft. long, 4 to 8 ft. wide and 7½ to 9 ft. deep, thus removing the entire bed of oolitic stone in two layers. After cutting vertically around the block, closely spaced holes are drilled horizontally at the base, wedges with slips are driven in and the blocks are pulled over by mechanical means. This large block is cut into smaller blocks by drilling closely spaced holes and driving the wedges with slips. The small blocks are loaded on to flat cars by derricks and shipped by rail to the dressing plant at Bowling Green. The top of the oolitic bed carries about a foot of siliceous material which is lost; sometimes this is less than a foot.

The present equipment at the quarry consists of one small yard locomotive, two channelers or stone block cutters, three derricks, two of which are operated by oil burning engines and one by electricity, four Sullivan boilers of 100 hp. each, one air compressor driven by a 100 hp. motor, 10 Hardscog air drills, three power houses and one machine shop. The electricity used is furnished by the Kentucky and Tennessee Utility Co. The water supply is taken from a large cave one-half mile east of the quarry near the base of one of the hills, and below the level of the quarry.

The Dressing Plant

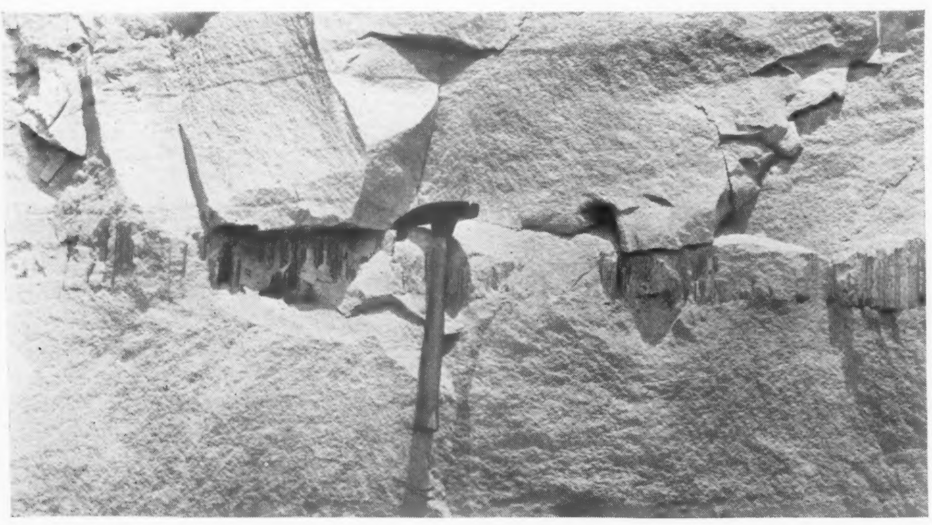
The dressing plant at Bowling Green has very modern equipment for dressing and preparation of stone building blocks, columns, capitals and almost any type of ornamental work which it is possible to make from the variety of stone. The equipment consists in the main of six gang saw sets which use the white Ottawa (Illinois) sand and cut at the average of 4 in. per hour, one diamond saw, one carborundum saw of the latest type, one combination diamond and carborundum saw, two double planers of the closed type, three single planers of the open side type, one turning lathe 24 ft. long with fluting apparatus, three electric cranes, one of which is 7½ tons and the other two are 25 tons capacity. The buildings consist of one machine shop, one mill building and one stone cutting and finishing building 35x168 ft.

The gang saws are used to saw the blocks shipped in from the quarry into slabs of varying thickness. Water with the Ottawa sand is fed into the grooves. These blocks are cut and trimmed according to specifications. Columns as long as 24 ft. can be turned on the lathe and when longer than this dimension the column is compounded. In the fluting of the columns, the column remains stationary and the fluting apparatus is moved. Ionic, Doric, Corinthian and other styles of capital carvings are made in the plant according to specification.

One hundred or more men are employed in the quarry and about 40 in the dressing plant and office. Only three of those employed in the dressing plant are union laborers and these are the stone cutters. The plant is on a spur track of the Louisville and Nashville railroad.

Large Sales Territory

The stone is shipped over a wide territory, as far east as New York, Philadelphia and Washington, as far south as Florida, Alabama and Mississippi and to St. Louis, Chicago and various points over the middle and upper Mississippi valley. The great bulk of the shipments goes to Kentucky and Tennessee. There are a number of other quarries around Bowling Green using the same oolitic limestone. The market conditions are very good at present, and the railroad facilities excellent. All conditions are favorable for the development of a good trade in the oolitic limestone.



Stylolithic structure developed in limestone overburden and running parallel to the bedding planes

[6]Analysis by D. F. Farrer, State Chemist to the Tennessee Geological Survey.

[7]Crump, Malcolm H.: Op. Cit., p. 1040.

Bulletin on Gypsum Manufacture

IN 1924 J. M. Porter, associate chemical engineer of the Bureau of Standards, vsited a number of gypsum mills in different parts of the country with a view to preparing a bulletin for his department on the manufacture of gypsum and its products. His paper has now just been issued as Circular of the Bureau of Standards No. 281, under the title, "The Technology of the Manufacture of Gypsum Products."

In his introductory general discussion of the subject, Mr. Porter classifies the different kinds of gypsum, the raw materials from which it is made, and describes the chemical reactions which take place in its production. He then enters upon a description of the process of manufacture of calclined gypsum. This will doubtless be found sufficiently complete for some purposes; but as it comprises but 30 pages, with fully one-third of these devoted to illustrations, it can be readily guessed that the treatment is not such as will be required by one who has more than an superficial interest in the subject.

Following this are brief sections on the manufacture of gypsum wall board and plaster board, on gypsum tile, and a closing section on miscellaneous use of this material. These sections were doubtless in line with current practice at the time they were written, but this art is developing rapidly and some progress has been made in the two years while this report was awaiting publication.

The most valuable part of the report for some readers will be the appendix, in which is given a brief but comprehensive description of each plant visited in the preparation of the paper.

Notes on the 1925 Production of Rock Products in Italy

By Carlo Parnisari
Consulting Mining Engineer, Pinerolo, Italy
(Translated by Margaret Arronet Corbin)

MATERIALS designated in America by the term "Rock Products" correspond to the Italian classification of quarry materials (Materiali di Cava) and include: white and colored marble, cut stone (granite, prophyry and syenite), slate, asbestos, talc, barite, quartz and feldspar, kaolin, magnesite, refractory materials, silica sand, fluorine, limestone, diatomaceous earth.

Other products, such as bauxite and leucite, are classed as mine products.

According to official reports, the total production of these materials amounted to one-half billion liras. It is believed that the actual figures are considerably higher than this amount.

Rock Products—The production is continually increasing, the present production being 50% higher than that of 1923.

The notes below do not include figures of gravel production, which is considerable and is carried on by up-to-date methods. The gravel is used for paving roads and streets in certain parts of Italy.

Marble—Marble is the most important quarry product, its annual production exceeding 500,000 tons valued at 150,000,000 liras. These figures include both white and colored marble.

The production of white marble is by far the most important. The classical source of white marble is the quarry at Carrara, from which marble is exported throughout the world. Colored marble is quarried in all parts of Italy.

Alabaster—The production of alabaster is restricted to the region of Toscana and amounts to over 6,000,000 liras.

Limestone—The limestone production is important. It is in part used for cement production. Extensive use is made in Italy of a natural cement derived from a limestone which is found in abundance in the region near Casale Monferrato.

The production of cement limestone is given for 1925 as 4,000,000 tons, which shows a considerable increase over that of 1924. This is due to the increase of reinforced concrete and road construction.

Limestone suitable for lime production is found in all parts of Italy.

Cut Stone, Granite, Porphyry and Syenite—A considerable decrease is noted in the production of these rocks. Before the war their production amounted to 390,000 tons and has since become reduced to 73,000 tons. These rocks are mainly quarried in northern Italy.

The reduction in output is due here to the increasing use of asphaltic rock, both in building and road construction, which is being preferred not only due to greater ease of handling but also to lower cost, considering the present high cost of labor.

However, it is to be hoped that cut stone, which is unexcelled in durability and beauty, will return to the construction field through the lowering of the cost of mechanical appliances (hammers, etc.).

Slate—Slate, which is quarried mainly in Liguria, is used mostly for export purposes, as this material is little adapted to the other sections of Italy. Italian slate is superior in quality to the product of any other country. The production is stated as 20,000 tons, but is believed to be higher than this figure.

WITH the increasing investments of American capital in foreign industries and nations, the American manufacturer has taken considerably more interest in the extent to which European manufacture has been carried on. Particularly is this so where the products made are somewhat similar to his own. For this reason, "Rock Products" believes that the article herewith on Italy's rock products will prove of interest to American producers and will enable them to carry on some sort of a comparison with their own operations.

Asbestos—The production of asbestos is low compared to that in other countries, but is increasing due to the exploitation of a quarry in Piemonte. The production is stated at 2500 tons.

Talc—The good quality of Italian talc, which formerly was the only one known, under the name of Venetian white, makes it sufficiently outstanding. Its production is carried on exclusively in the Pinerolese mountains at a considerable altitude (about 2000 meters). The talc is conveyed to a lower level where is located a plant manufacturing various talc products, such as insulators, etc.

The production amounts to about 35,000 tons.

Magnesite—Magnesite is found in Toscana and in Piemonte, although the two sources differ considerably. Its production is increasing and is at present over 13,000 tons.

Barytes — The production of barytes is stated as 40,000 tons.

Fluorspar—Produced exclusively in Lombardy near Trentino; 7000 tons.

Quartz and Feldspar—Production about 63,000 tons.

Kaolin—Production about 35,000 tons.

Chalk—Chalk is very abundant, particularly in Sicily, Piemonte and Lombardy. Production about 600,000 tons. Extensive use is made in Italy for structural purposes, particularly in the province of Rome, of volcanic rock, lava, basalt, trachite, volcanic tufa, puzzolan. Their production amounts to more than 2,000,000 tons.

Clay and Terra Cotta—The production, carried on in all parts of Italy, is stated as over 6,000,000 tons.

Of the materials, classed in Italy as mine products, the following are mined: asphaltic and bituminous rock, leucite and bauxite.

Asphaltic and Bituminous Rock—This material, found in Sicily and in the vicinity of Abruzzi, is used partly for distillation and partly on road construction. The production amounts to 160,000 tons.

Leucite—Leucite is used for the production of potash. Its production is limited to the province of Caserta and is stated as 16,000 tons.

Bauxite—The production of bauxite, which is carried on in Abruzzo and in Istria, is increasing continuously. The actual production is 200,000 tons.

Poured Gypsum Concrete Floors Pass Fire Test Requirements in New York

BEFORE any new type of floor and roof construction can be used in fireproof buildings in the city or state of New York it must pass the following test:

At least one panel of the proposed maximum span carrying a live-load of at least 150 lb. per sq. ft. shall be subjected to a fire continuous for four hours at an average temperature of 1700 deg. F., followed by the application, for not less than ten minutes, of a hose stream from a 1⅛-ft. nozzle at 60-lb. nozzle pressure without appreciable deterioration or the passage of flame through the floor during the test. In addition, the floor must sustain, after the test, a uniformly distributed live-load of 600 lb. per sq. ft., without exceeding a stated permanent deflection.

Excellent results recently obtained in a test of a gypsum slab floor at the Columbia University Testing Laboratories and reported in a recent issue of *Engineering News-Record* prove that it is entirely possible to obtain high fire-resistance in light-weight construction, and thus show that the test is by no means so severe as to hinder development in this field.

The ceiling slab proved to be an efficient fire protection and the floor slab and structural framework were found to be unaffected by the fire and water tests.

Sales Policies as Applied to Agricultural Limestone and Fertilizers

Timely Suggestions Made at the Recent Fertility Conference at Wooster, Ohio

By Dr. Firman E. Bear
Chief of Soils Department, Ohio State University, Columbus, Ohio

THE old adage says: "If a man build a better mouse trap than his neighbor, the world will wear a path to his door, though he dwell in a hut in the wilderness." But the fact is that the world will do no such thing. Some very effective mouse traps have been invented. Other schemes for the eradication of rats and mice are well known. Yet we are suffering an annual loss of food products in this country that is enormous, simply because there is no well organized sales force whose business it is not to persuade us of the effectiveness of mouse traps, rat biscuits, good cats and rat terrier dogs, but also to sell them to us.

Effectiveness of Sales Programs

A large part of what is termed progress in this country has been due to thoroughly planned sales programs that have been carried through to success. In some cases we have been sold articles that we did not need. This makes it all the more important that really worth-while products should be represented by such sales organizations as will make them occupy a position in the public mind and use in keeping with their merits. If farmers are not sold limestone and other things they really need, they may buy oil stock or land in Florida or Texas. There is no question but that successful farmers who have money to invest will often find their best investment in something which increases the efficiency of their own farms. There is very little land that cannot be made to produce larger crop yields at a profit. It is not uncommon for an investment in fertilizer to pay back the principal and 100% or more of "interest" before a year has passed.

Any fertilizer salesman who fails to give due credit to devices for maintaining productivity, or who fails to encourage a policy designed to take advantage of the resources of the air, and of the waste products of the farm, misrepresents the industry. The fertilizer business has for its purpose the supplying of the essential nitrogen and mineral nutrients of crops only insofar as it can be done more economically by the use of fertilizer than by any other means. This, of necessity, means that some types of farming will require little or no fertilizer, while in other cases it will be cheaper to depend upon the fertilizer bag for practically the entire requirements of the crop. A ton of fertilizer per acre, costing $40, does not disturb a man who produces $1,000 worth of product on the acre, but it is more than enough for the land on which the crops grown are such that, no matter how high the yield is pushed in the direction of the maximum, the acre value could not exceed perhaps $50 or $60.

Selling Cost Is Necessary

It is apparent that if the use of more pounds of fertilizer or a change in the analysis will increase the acre profit, in growing crops, we are justified in using such sales effort as will convince the farmer of that fact even though the cost of that effort must be added to the total expense involved in getting the fertilizer to him. It is at this point that we see the difference between a sales organization whose policy is that of getting the farmer to buy high analysis fertilizers, suited to the needs of his crops and the limitations of his pocketbook, and one whose only interest seems to lie in "putting one over" on those farmers who will stand for it. Suspicion of the integrity of fertilizer manufacturers and the development of the co-operative method of fertilizer purchase are fruits of the latter policy.

There are those who seem to feel that the co-operative method of purchase of fertilizers by farmers must be done away with no matter at what cost. But farmers who strive by co-operative methods to eliminate some of the expense between the factory and the farm, and to secure products of known quality, are to be commended for their attitude on this question. It does not seem to me that because there have long been sales organizations of the present type that we need assume the necessity of their continuing to exist. A large percentage of the fertilizer dealers render no actual service to the farmers who buy fertilizer of them. Whether farmers buy co-operatively or not will be determined in large part by the degree to which service is rendered to them by the sales organization of the fertilizer companies with which they deal. Co-operative purchase is simply a challenge to the sales forces as to the justification for their existence.

Individual vs. Co-operative Buying

However, if equal service is rendered to the farmer, and if the quality of the fertilizer is as good as is possible for the modern fertilizer factory and sales organization to effect, then co-operatively purchased fertilizers are quite likely to cost as much as if they had been bought in the usual way. Among the items of cost must be considered such matters as working for the neighbors for nothing; the expense of inexperience and failures of co-operatives; the antagonisms aroused among local business men who are valuable members of the community; the interest on cash at the car door; the failure to use as much fertilizer as a reliable agent would have encouraged the farmer to use; and the fact that if the amounts purchased were inadequate the dealer's warehouse always contains a few left-over bags of fertilizer. If farmers can establish for themselves an informational service on fertilizers, and can encourage the formation of local co-operative units, they will make a very valuable contribution to the solution of this rather difficult problem.

The co-operative purchase of fertilizer by farmers has probably justified itself. The fact that it has been done and can be done is not overlooked by those who have fertilizer to sell. There is no justification for a sales organization unless it can give the farmer more for his money, all things considered, than he can get if he co-operates with his neighbors. But the encouragement to use more fertilizer of the right composition and quality is a part of the service which the fertilizer salesman must render.

Selling a Worth-while Service

If I were a fertilizer salesman I would get part of my compensation out of the thought that I was rendering a worth-while service to the farmer and to the nation. We will either feed ourselves or South America and Canada will do it for us. If we increase our population on foreign food we may find when the time comes to fall back on our own resources that our farmers are inadequately prepared for the task. It should be possible to farm in competition with the still virgin foreign lands. Our ability to do this will be determined in large part by the conditions in which the soil is maintained. If a soil-improving program, including an adequate use of higher analysis fertilizers of better quality, is put into effect that is sufficient to meet the needs of our increasing population, our farmers should continue to occupy a position far above the plane of the peasant farmers of Europe.

Proportioning Raw Materials in Cement Manufacture

By G. R. Brobst
Allentown, Penn.

IT is with considerable interest that one notes a revival of a useful formula for the proper portioning of raw materials in cement manufacture.

Referring to the methods employed by Messrs. Ernst as set forth in ROCK PRODUCTS of June 12, "Proportioning Cement Raw Materials," it would appear that the irrespective subtracting of acid totals from basic totals and basic totals from acid totals vitiated results. When this rule is observed a ratio of 3.176 is obtained against 3.520, a difference of .344. Using the analyses submitted by Messrs. Ernst, my method of calculating mixtures follows:

Eckel's Cementation Index

$$\frac{(2.8\times\%SiO_2)+(1.1\times Al_2O_3)+(.7\times\%Fe_2O_3}{(\%CaO)+(1.4\times\%MgO)}=1.0$$

$$\frac{SiO_2}{R_2O_3}=2.0\text{ to }2.2$$

$$\frac{Al_2O_3}{Fe_2O_3}=2.2\text{ to }3.3$$

$$\frac{SiO_2}{Al_2O_3}=2.75\text{ to }3.0$$

	Limestone Per Cent	Shale Per Cent
Silica (SiO_2)	1.22	56.38
Alumina (Al_2O_3)	.34	20.00
Iron oxide (Fe_2O_3)	.44	5.52
Lime (CaO)	54.46	.74
Magnesia (MgO)	.48	2.33
Sulphur trioxide (SO_3)	.03	1.64
Loss on ignition	42.95	14.00

Limestone

Silica	2.8 × 1.22 =	3.416
Alumina	1.1 × .34 =	.374
Iron oxide	.7 × .44 =	.308
		4.098
Lime	1.0 × 54.46 =	54.46
Magnesia	1.4 × .48 =	.672
		55.132

Shale

Silica	2.8 × 56.38 =	157.864
Alumina	1.1 × 20.00 =	22.000
Iron oxide	.7 × 5.52 =	3.864
		183.728
Lime	1.0 × .74 =	.74
Magnesia	1.4 × 2.33 =	3.262
		4.002
Acid units limestone	=	4.096
Acid units shale	=	183.728
	Total =	187.826
Basic units limestone	=	55.132
Basic units shale	=	4.002
	Total =	59.134

$$\frac{187.826}{59.134}=3.176\text{ parts of limestone to 1 part of shale.}$$

The resulting clinker may now be calculated as follows:

Limestone

SiO_2	1.22 × 3.176 =	3.8747 units + 56.38 ÷ 4.176 =	14.43
Al_2O_3	.34 × 3.176 =	1.0798 units + 20.00 ÷ 4.176 =	5.05
Fe_2O_3	.44 × 3.176 =	1.3974 units + 5.52 ÷ 4.176 =	1.65
CaO	54.46 × 3.176 =	172.9649 units + .74 ÷ 4.176 =	41.59
MgO	.48 × 3.176 =	1.5244 units + 2.33 ÷ 4.176 =	.94
SO_3	.03 × 3.176 =	.0952 units + 1.64 ÷ 4.176 =	.41
Loss	42.95 × 3.176 =	136.5680 units + 14.00 ÷ 4.176 =	36.00
			100.00 + .07

As there is an ignition loss of 36.0 units the clinker total is therefore 64.00, to which must be added 2.50 units for coal ash which enters the clinker during calcining. We have therefore a clinker total of 66.50, considering the coal to contain 10% ash and that 100 lb. are required to calcine one bbl. of clinker.

The ash from fuel is divided as follows:

SiO_2	14.43 + 1.00 = 15.43 ÷ 66.5 × 100 =	23.20
Al_2O_3	5.05 + .25 = 5.30 ÷ 66.5 × 100 =	7.97
Fe_2O_3	.165 + .25 = 1.90 ÷ 66.5 × 100 =	2.85
CaO	41.59 + .75 = 42.34 ÷ 66.5 × 100 =	63.66
MgO	.94 + .25 = 1.19 ÷ 66.5 × 100 =	1.78
SO_3	.41 + .00 = .41 ÷ 66.5 × 100 =	.61
		100.00 + .07

Where gas or oil is used for calcining, the increase for clinker total is unnecessary.

About 3% of gypsum is added to the clinker, and allowance must be made for it. The cement will then analyze as follows:

SiO_2	23.20 + .19 ÷ 103 =	22.70
Al_2O_3	7.97 + .03 ÷ 103 =	7.76
Fe_2O_3	2.85 + .06 ÷ 103 =	2.82
CaO	63.66 + .79 ÷ 103 =	62.57
MgO	1.78 + .00 ÷ 103 =	1.73
SO_3	.61 + 1.25 ÷ 103 =	1.80
H_2O	.00 + .58 ÷ 103 =	.56
		100.00 — .06

Coal ash should be analyzed at times, for it varies according to the grades used.

The above method of calculating has been referred to by Meade in one of his earlier books on cement. It differs, however, in detail.

Determination of Barrels of Cement in a Given Quantity of Slurry

Cylindrical tank, diam. 20 ft.
Weight of barrel of raw material (dry), 626.5 lb.
One cu. d. m. = .035314 cu. ft.
One kg. = 2.206 lb.

Vol. slurry in tank (1 in. in depth) =

$$\frac{3.1416\times10^2}{12}=26.18\text{ cu. ft.}$$

$$\frac{\text{Vol. slurry}}{.035314\text{ (1 cu. d.m.)}}=741.34\text{ cu. d.m. or liters of slurry}$$

$$\frac{\text{Wt. bbl. of raw dry material (lb.)}}{\text{Wt. of kg. in lb.}}=\frac{626.5}{2.206}=284\text{ kg.}$$

The weight of a liter of slurry may be determined by weighing 200 c.c. of slurry incidental to the moisture determination.

Formula

$$344\text{ g. wt.} - 110\text{ g. }H_2O = 234\text{ g.}\times 5 = 1.170\text{ kg.}$$

$$\frac{344\text{ g. wt.} - 110\text{ g. }H_2O}{200\text{ c.c. slurry} - 110\text{ g. in c.c.}}=2.6\text{ sp. gr. of slurry}$$

$$\frac{1.170\text{ kg.}\times 741.34\text{ liters of slurry}}{284\text{ kg.}}=2.25\text{ bbl. per in.}$$

Reply to Mr. Brobst by Messrs. Ernst

COPY of the foregoing article was forwarded by the editors to William A. Ernst and Edgar S. Ernst, authors of the article in question, and they have commented as follows:

"We have read with interest the comment by G. R. Brobst on the methods which we employed in arriving at the combining ratios of the limestone and shale as set forth in our article appearing in your June 12 issue. In the light of our supplementary article on page 55 of your July 10 issue, it seems a little like holding a post mortem to comment further on this formula. We are, however, of the opinion that Mr. Brobst's treatment of this subject fails to give proper consideration to the units employed, possibly through a confusion of weights and percentages.

"Granting, for the moment, the correctness of Eckel's index for the purposes of illustration, it is evident that to satisfy this formula, which we understand is the object sought, 2.8 times the percentage of silica in the raw mixture plus 1.1 times the percentage of the alumina plus .7 times the percentage of the oxide of iron must equal the sum of the percentage of lime plus 1.4 times the percentage of the oxide of magnesia to obtain the ratio of unity which the index calls for. This, even a hasty calculation will show, Mr. Brobst has not achieved.

"Referring to 'the irrespective subtracting of acid totals from basic totals and basic totals from acid totals,' it seems clear that to find the acids of the shale used which are *available* for combination with the bases of the limestone, we must subtract that portion of the 'acid total' which is taken up by the bases already present in the shale. And, to ascertain the *available* bases in the limestone, we must subtract the 'acid totals' of the limestone from the 'basic total.' Reference to Eckel's text and to a number of others which deal with this subject, we think, will bear us out in our use of this formula.

"Since it is a well-known fact that coal ash and the added sulphates affect the composition of the final product, this portion of the article needs no further comment.

"We would like to call your attention, however, to what is, no doubt, a typographical error. We refer to the statement that the specific gravity of the slurry is 2.6. This, no doubt, was intended to represent the specific gravity of the solid raw material *in the slurry*. We find the figure representing the barrels of raw material per inch of slurry in the tank somewhat low, also.

"We will welcome further comment and thank you for calling this matter to our attention."

Advances in the Manufacture and Use of Cementitious Materials

Editorial Correspondence from Points Where Technical Investigation Is in Progress

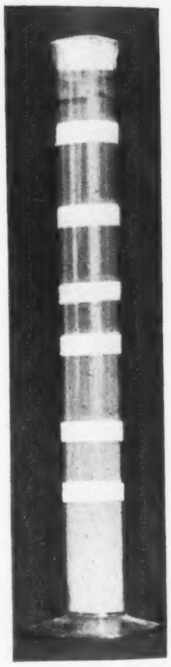
By Edmund Shaw
Editor, Rock Products

THE principal impression that remains from a visit to the main cities of the Atlantic coast is that we are making considerable progress in both the manufacture and use of cementitious materials, and that there is no fear that this important branch of the rock products industry will become static. Much of the information obtained by visiting bureaus in Washington and certain laboratories concerns work that is not far enough advanced to admit of publication at present, but it is none the less gratifying to be able to report that real progress is being made in some matters where admittedly improvement was needed.

Improvement in Testing Portland Cement

One of these matters is the testing of portland cement, especially the determination of the mortar tensile strength at seven and 28 days. While the usual testing methods have served practical commercial purposes, it is an open secret that checking has not hitherto been as close as could be desired. Cement manufacturers have felt that it was somewhat unfair that the reputation of their product should so largely lie in the hands of physical testing men who might or might not have received the proper training for the work, using apparatus that perhaps had not been carefully calibrated. But there is evidence of improvement in the work of many testing laboratories. At one of the bureaus in Washington the writer was shown the results of a checking test participated in by laboratories from many parts of the country in which the results agreed more closely than those of other similar investigations. It now appears to be the fact that cement strength tests which are made in strict accordance with the new A. S. T. M. rules (adopted at the meeting in June) and made with calibrated apparatus, will check one another within reasonable limits. More than one-half of the laboratories participating in the test referred to reported results which varied from the correct tensile strength at seven days by only a narrow margin.

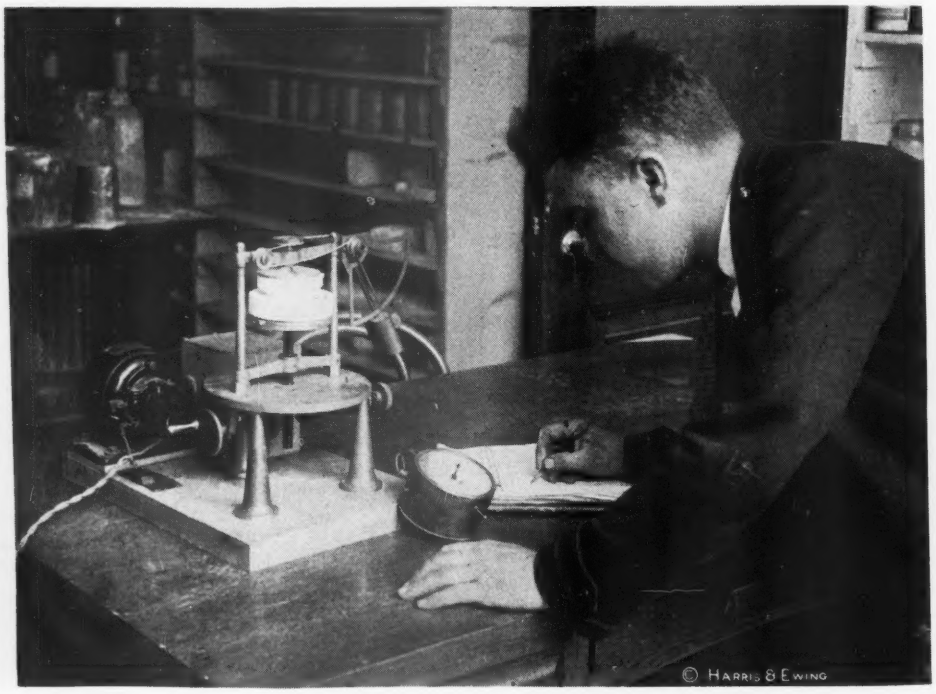
Progressive cement manufacturers are studying the effect of grinding on both raw materials and the finished product and in this work the air analyzer which was developed at the Bureau of Standards is of the greatest value. The writer spent considerable time in studying the operation of this apparatus, which has been worked out with so much care and attention to detail. It separates particles as small as 10 microns diameter, which is 0.01 mm. or roughly 4/10,000 of an inch. This would be about 2000 mesh if it were possible to make such a screen. To raise such a particle and separate it definitely from larger particles requires an air current rising with a velocity of about 7 mm. per second, or between 16 and 17 in. per minute. Currents of air of considerably greater velocity than this flow all around us in any room which is ventilated at all and the body cannot perceive them.



Cement sized by air analyzer

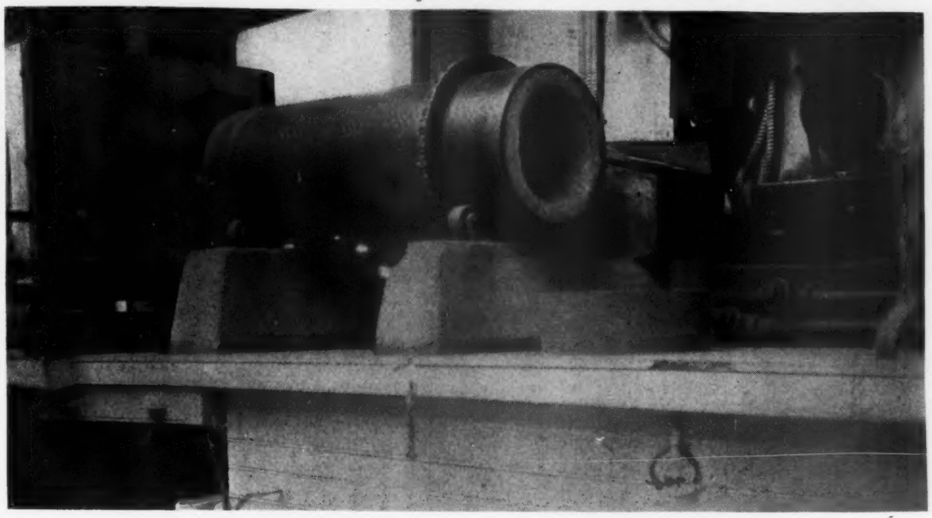
Some such apparatus is necessary to study the effect of fine grinding of raw materials and of the finished product of cement making. Although sieves as fine as 400 mesh have been made, and the 325 mesh screen is actually in use, such fine screens are expensive, apt to be inaccurate and are very easily damaged. Anyway so large a part of a sample of cement is finer than the finest screen that could be made, so that a screen test shows nothing of the real fineness of the product. The alternative is the counting and measuring of particles under a microscope, too tedious a job for an ordinary laboratory process and one that requires too much special training.

It is probable that air analysis is to play a large part in cement manufacture in the future. At the office of one of the larger



Plasticimeter devised by the Bureau of Standards for determining the plasticity of lime

cement manufacturers the writer was shown some samples made by the air analyzer which were part of an investigation now being made on the effect of grinding the raw materials to different degrees of fineness. At the Bureau of Standards the writer was told that the air analyzer was already cataloged by makers of laboratory apparatus. It will probably find uses in other parts of the rock products industry than cement making, such as the grinding of talc, limestone and other substances to a fine mesh.

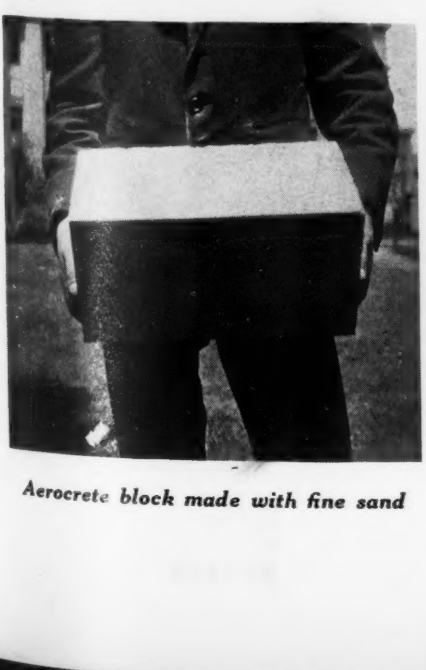


Miniature kiln and electric furnace in research laboratory

Co-operation of Competitive Materials

Another strong impression gained from this trip was the amount of cooperation there is with so-called competitive materials. In Philadelphia a very large use of a lime portland cement stucco was noted. Other combinations with which every one is more or less familiar are made by using hydrated lime in concrete, Keene's cement in lime plaster and Lumnite cement in lime plaster. Since lime enters into these compounds in so large a part the National Lime Association is doing the right thing in initiating a thorough study of compounds in which lime is used. While the writer was at the association's offices in Washington he met P. A. Bury, who has just accepted a fellowship maintained by the association for investigating the use of lime in concrete at the Bureau of Standards. Tests are to simulate working conditions of mixing and placing concrete on the job so far as possible, as the workability with a low water-cement ratio is one of the main advantages claimed by the advocates of hydrated lime in concrete.

More workable and less permeable concrete will benefit the cement industry as well as the lime industry. But a little calculation will show that the general use of hydrated lime in concrete will call for a large increase in lime production. In 1925 there were 103,000,000 yd. of concrete placed. If only 5% of hydrated lime had been added to the cement it would have meant the use of 1,500,000 to 2,000,000 tons, depending on how much cement is figured to the yard. Nothing like such an amount is used in concrete today.



Aerocrete block made with fine sand

Lime in Cement Products

Lime in cement products is another matter that is being thoroughly studied by the association and the results show increased strength and decreased permeability from its use. The matter of permeability is not so important in colder climates where cement block are not much used without being covered with stucco or brick veneer, but in warmer climates where block are used without covering it is important. The writer's attention was called to this in both southern California and Florida, where block makers said objection had been made to their product because uncovered walls of concrete block has been penetrated by driving rains. The use of hydrated lime reduces the permeability so markedly it is a wonder that it is not more widely used, especially as the lime association has issued a bulletin which covers the matter very completely.

May Be Side Line for Cement Block Makers

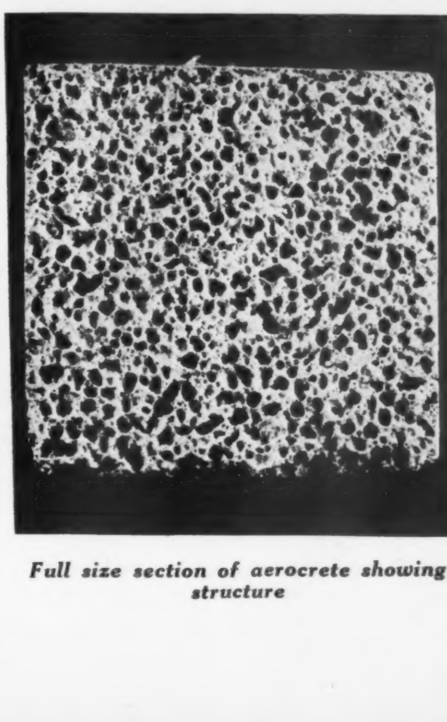
Another interesting exhibit at the lime association's rooms was that of building block made with lime. These interested the writer because he had seen a pile of leftovers from actual construction in which these block had been employed that had been exposed to the weather for two years without showing much disintegration, although some blocks which were laid flat on the ground had disintegrated. The lime block, which is still in the experimental stage, would seem to hold an intermediate place between the cement block and the gypsum block, both as regards weight and resistance to dampness.

Among light weight building materials, Aerocrete, the porous concrete described in the May 29, 1926, issue of Rock Products, promises to make a place for itself in the United States, as it has already done in Europe. In New York I met Gustaf Lang, who is introducing it here, and went with him to the laboratory of Columbia University to see some blocks and test pieces which had been made there. The plant and the process of making this material are both simple and inexpensive and it is probable that Aerocrete blocks may develop into a profitable sideline for concrete block may be- Cinders and burned shale have been mostly used for Aerocrete aggregate, but the writer was shown some blocks made with a fine sand aggregate which were only a little heavier than those made with cinders.

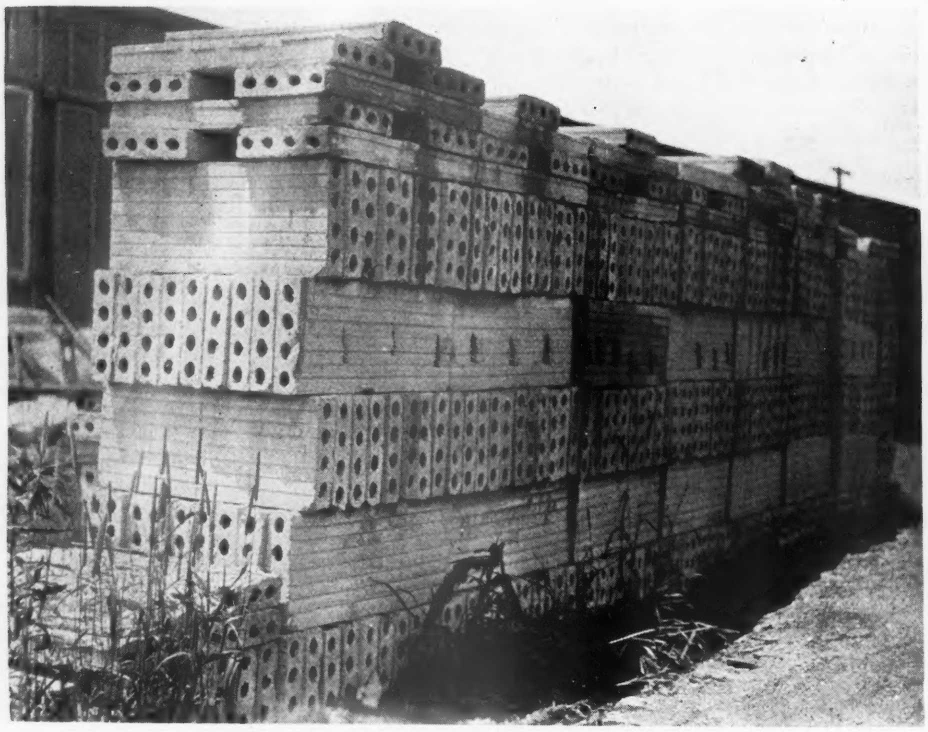
In Sweden, where the making of Aerocrete block is a regular industry, the material is cast in slabs over tightly stretched wires. When the material is at the right consistency the wires are raised, cutting the slab into blocks of the required size. In Europe this porous concrete is now being used for floors and roof slabs as well as partitions.

New Cements and Plasters

A curiosity in cements was shown the writer at the Krauss Research Laboratories in New York. This is a freak cement accidentally hit upon in the course of an investigation for another material. It is made of a specially treated clay and lime combined at a low temperature. The sample shown was made at 320 deg. F. The peculiarity of this



Full size section of aerocrete showing structure



Lime building block exposed to weather for two years

cement is its rapid setting and hardening under water. It was firmly set in ten minutes under water and appeared to be as hard at the end of an hour as it was 24 hr. later. In air neither the setting nor the hardening was so fast. Of course, such rapid setting and hardening compounds are not unknown. J. E. Duchez in one of his articles in Rock Products mentions one which he made to use in stopping a leak in a French canal and also for making cement blocks for rapid house construction. Mr. Krauss does not care to say much about this new cement, as he has to do a great deal of work with it before it becomes a commercial product.

The Krauss laboratories have developed a new refractory cement that will stand temperatures to 2900 deg. F. without disintegrating. This may have a use in the rock products industries for lining lime and cement kilns with refractory concrete. The patents on this product have been sold to the Johns-Manville Co.

Rock Products readers may possibly remember an article on the new quick setting lime plaster developed by the Krauss laboratories which was published in the issue of September 5, 1925. This product has now gone from the laboratory to the manufacturing stage and it is being made in a small way at a factory in Cockeysville, Md., which the writer visited recently. The plant is more for demonstration than to turn out the plaster in large tonnages, but the process is working continuously and the data obtained are to be used in building a plant which will be erected soon near Baltimore. The product of the small plant is being distributed to plasterers so that it can be tried out in various parts of the country.

As is often the case, the manufactured product has turned out better than the laboratory product. It was expected that a modulus of rupture of 80 lb. after 14 hr. would be developed, but actually the modulus of rupture of the test pieces from the factory product was 113 lb. The plaster is very "fat" and gains in "fatness" for a short time after it has been mixed. On this account it has an unusually high sand carrying capacity.

The testing of lime plasters has been brought to a scientific basis by the use of the plasticimeter. A form developed by the Bureau of Standards and described in a number of recent newspaper articles is shown in actual service at the bureau on page 66 of this issue.

Oklahoma Man Alleges Cement Makers Have a "Trust"

ATTACK on what was termed a "cement trust" in Oklahoma was launched in a complaint filed with the corporation commission against all portland cement companies operating in the state, by T. D. Gregory, Okmulgee lumber dealer.

Gregory alleged that the Oklahoma Portland Cement Co., the Dewey Portland Cement Co., and 11 other companies, operating in the state, but not named specifically in the complaint, had formed a combination in restraint of trade. He asked that the corporation commission investigate the alleged "trust."

Similar investigation of the activities of the Great Western Portland Cement Co. of Kansas City, and other companies selling cement in Oklahoma through interstate shipments, has been asked of the Federal trade commission, Gregory set out in his complaint.

The complaint against the cement companies grew out of their alleged action in refusing to sell Gregory cement, which he could resell at retail from his lumber yard, it was set out in the petition.

Gregory alleged that he was about to consummate a contract by which he would supply the cement for work that was to be done on the city waterworks at Okmulgee, when the cement companies learned of the deal and refused to sell him cement.—*Oklahoma (Okla.) Oklahoman.*

Can't Grind It Fast Enough

ONE of the Vermont counties on which records have been kept used only 250 tons of agricultural limestone in the 10-year period 1913 to 1923. In 1924 it was 361 tons and in 1925 it went up to 557 tons and more would have been used if procurable. Now they can't grind it fast enough.

Demonstration plant for making new quick setting lime plaster

Dredge at No. 1 plant of Price Sand Co., Tulsa, Okla.

Dredging Sand Under Ideal Conditions

Price Sand Co. Taking Best Quality of Concrete Sand from Arkansas River Near Tulsa, Okla.

THE Price Sand Co. of Tulsa, Okla., operates three plants almost side by side on the Arkansas river, five and one-half miles from Tulsa. The three plants were acquired by purchase from individual owners by the present operating company, but have been entirely rebuilt so that nothing remains of the original installation.

Price is only a station on the Frisco railroad, without a postoffice, but it is the center of a considerable mineral production. Not only the sand plants are there but a limestone crushing plant and an oil well. The sand company has substantial buildings and has put in a good piece of road and cement sidewalks along by its property. The whole layout is unusually neat and efficient.

Cable delivering electric current is wound on reel shown

The system of working is the same at all three plants. The sand is pumped from the river by an 8-in. dredge to a concrete sump or catch-basin provided with a slat overflow. It is loaded from the sump to cars, or to a stockpile, by a derrick with a clamshell bucket.

At the No. 1 plant the dredge has a steel hull 45x25 ft. on the deck and 40x20 ft. on the bottom. It is 3 ft. deep on the sides and draws about 2 ft. The building of the dredge hull larger at the top than at the bottom was the result of experiment and it has been found that a hull of this shape handles easier in the current.

The pump on this dredge is an 8-in. "Amsco" made by the American Manganese Steel Co. It is direct-connected to a General Electric motor, of the variable speed type, of 150 hp. The suction is short as the river is very shallow. The discharge pipe is carried on solidly built steel pontoons which have an arrangement for holding the pipe above the deck so that the entire pipe line can be brought to a level. In front of the dredge hull is a crane (with a hand winch) built of 4-in. angle irons and this is used in putting in or taking out lengths of pipe.

Screen over pump discharge into sump

Sump solidly built of reinforced concrete

Lines and suction are handled by a Mead-Morrison hoist with a 5-hp. General Electric motor.

The Arkansas river probably carries as high a burden of good concrete sand as any river in the country. It is mostly moving sand, which pumps easily. The 8-in. pump at times pumps four 50-ton cars an hour, the percentage of solids in the discharge is so high. No cutters or other feeding devices are needed for this. The sand is classified by the river, so that no classification is needed in the plant; only settling and de-watering. The conditions for sand recovery at Tulsa are the nearest to the ideal that the writer has noted.

The sump at No. 1 plant will hold 110 carloads. It is curved to accommodate it to the track of the bucket of the derrick and it is 36 ft. deep. The area at the top is about 3600 sq. ft. It is solidly built of poured concrete and the walls are buttressed. The water which comes in with the sand is run off at a gate in the far end. This gate extends all the way up and down and the height of the overflow may be adjusted, as the sump fills, by putting slats of wood in a frame. This keeps any pool of dirty water from standing on the sand and washes off any light stuff that may have passed through the screen.

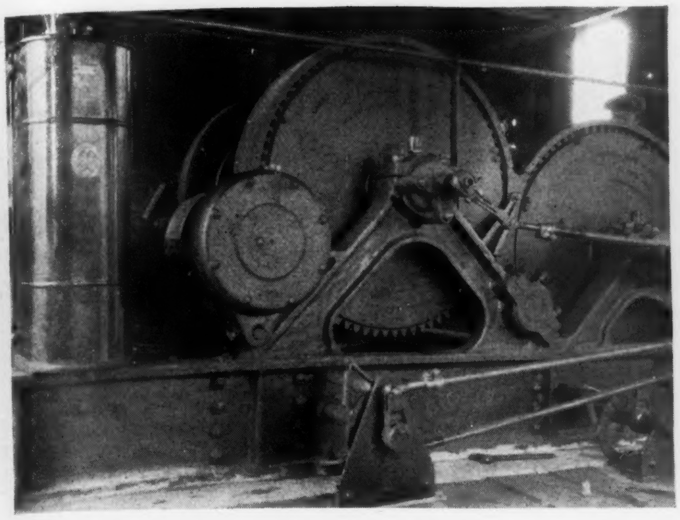
This screen, which receives the pump discharge, is set in an iron frame at the other end of the sump from the overflow gate. Its purpose is to remove stones and trash, so it is of fairly large mesh, ½-in. square. Below the screen is an iron box with outlets for turning the flow to different parts of the sump, but these do not often need to be used.

The derrick which unloads the sand was built by the Browning Engineering Co., and is of lattice steel construction with a boom 54 ft. long. The bucket is of Browning make and holds 2½ yd. It is handled by a Mead-Morrison three-drum hoist, which is powered by a 50-hp. General Electric motor. The electrical controls are of the same make as the motor. An independent hoist with a 5-hp. Westinghouse motor is used to turn the bullwheel.

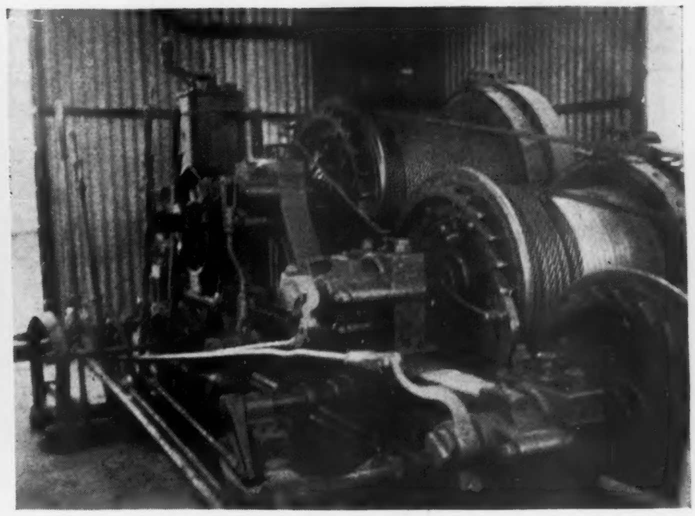
The hoist is placed in a neat building of concrete blocks which were made by the company. The steps to the house and the piers are all of concrete, so that everything is constructed in the most substantial way.

At the No. 2 plant the dredge has an 8-in. "Amsco" pump and a 150-hp. variable speed General Electric motor, but they are not direct-connected. The direct-connected motor is thought to be more satisfactory than the belt-connected arrangement at No. 2, and when

Three different methods of loading and unloading at the different plants



Hoist at No. 1 plant



Hoist at No. 2 plant

a new dredge is built it will be of the direct-connected type. Pontoons and pipe line are arranged as in the No. 1 plant, except that the crane for handling pipes is on one of the pontoons. This pontoon crane is a handy device for doing other work than handling pipe; handling the anchors, for example. A small hoist with a 5-hp. motor handles the anchor lines.

The sump at this plant is much smaller, as it is only 16x28 ft. on top. It has the same slat gate for overflow. It will hold about six cars.

The derrick by which the sand is removed from the sump at No. 2 is an Insley derrick with a 100-ft. boom. The long boom is needed at this plant, for a stockpile is built with it on the other side of the railroad track from the sump. This stockpile will hold about 500 cars of sand.

The hoist for this derrick is of the three-drum type and was built by the Clyde Iron Works. It is powered with a 50-hp. General Electric motor and a small hoist with a 5-hp. Westinghouse motor is used for the swing.

The No. 3 plant, which is called the O. K. Sand Co. plant, has no dredge at present. The dredge at No. 2 serves both the No. 2 and No. 3 plants, which it can do easily as the sumps are small. The sump at No. 3 is 16x28 ft., the same dimensions as those of the No. 2 sump.

The unloader at No. 3 is not a derrick but a traveling crane with a 2½-yd. bucket of an unknown make. The crane is not so fast as the derrick and it cannot build a stockpile. It is expected that it will be changed for a derrick or a "whirley" crane, mounted on a central pier.

At all these plants crews work alternately on the dredges and at the unloading plants. Few men are required, as a crew can be shifted from one plant to the other as desired.

The office of the Price Sand Co. is in the Mayo building at Tulsa and J. M. Chandler is secretary-treasurer.

Claude Wadsworth, superintendent of Price Sand Co.'s plants

Crane on front end of dredge handles pipe sections

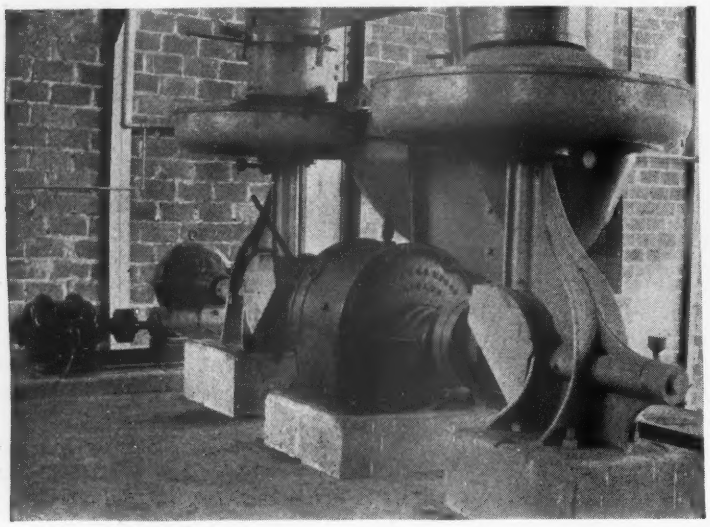
Zonolite Is a Vermiculite

IN ROCK PRODUCTS, June 26 issue, considerable reference was made to zonolite, the new light-weight insulator. As zonolite, which is a trade name given to the mineral by the producers, there is no reference to it in Dana's Mineralogy. However, Prof. A. C. Lane, Tufts College, Mass., has kindly written us and properly identified the mineral. He says: "The mineral you have reference to is known as vermiculite and is described in Dana, p. 572. It derives its name from the peculiar property it possesses of swelling under the influence of heat so that it resembles vermicelli. Vermiculite is also mentioned in Table I of my Lefax tables and more completely described in Tables II and XIX. Further reference to it can be found in the Encylopedia Brittanica, Vol. 6, p. 237, under chlorite. It sometimes goes under the name of Jeffersonname of Jefferisite."

Hints and Helps for Superintendents

Device for Accurate Mixing and Proportioning of Gypsum and Clinker

A NEW development which is of interest to cement manufacturers is a perfected feeding device which insures continuous, accurate proportioning and mixing of clinker and gypsum, and eliminates any tendency of the material to segregate.



Accurate mixing and proportioning of gypsum and clinker is obtained by this device

General practice in mixing gypsum and clinker is to weigh each separately, mix and convey it to large feed-bins over the first finish grinding machines, which are then fed by gravity.

The device shown in the accompanying illustration was developed by engineers of the International Cement Corp. and is in use at several of their plants. It was described briefly in the story of the Virginia Portland Cement Corp. plant at Norfolk, Va. (Rock Products, April 17).

The apparatus consists of two standard flat-top feed-tables, which are in effect flat revolving discs. The materials are fed to these tables through telescopic feed-pipes from overhead bins. The discharge from the feed-tables is controlled by diagonal scraper cut-off knives.

Three distinct adjustments tend to the refinement of the process: Height of telescopic feed-pipe above table, speed of revolution of tables, which can be regulated independently of each other, and angle of scraper cut-off knife.

The quantity of material fed from the bins is governed by the height of the open end of the telescopic pipe above the feed-table, thus controlling the size of the pile of material resting on the table.

The relative speed with which the two tables move controls the proportion of the two materials to each other.

The angle at which the cut-off scraper knives are set gives control of discharge.

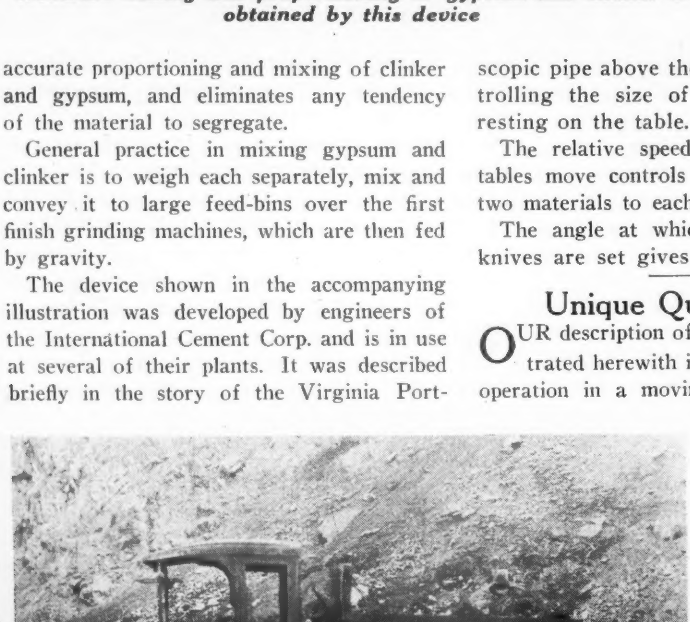
Unique Quarry Truck

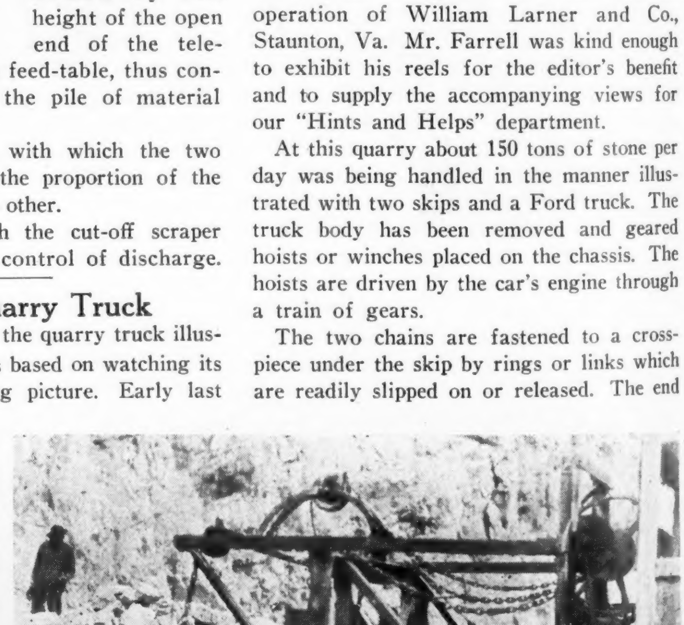
OUR description of the quarry truck illustrated herewith is based on watching its operation in a moving picture. Early last spring W. E. Farrell, president of the Easton Car and Construction Co., Easton, Penn., made a quite extensive tour of Southern quarries, taking moving pictures of things of interest, and among his other "finds" was the operation of William Larner and Co., Staunton, Va. Mr. Farrell was kind enough to exhibit his reels for the editor's benefit and to supply the accompanying views for our "Hints and Helps" department.

Skips are dumped by taking up on suspension chains and ropes

At this quarry about 150 tons of stone per day was being handled in the manner illustrated with two skips and a Ford truck. The truck body has been removed and geared hoists or winches placed on the chassis. The hoists are driven by the car's engine through a train of gears.

The two chains are fastened to a crosspiece under the skip by rings or links which are readily slipped on or released. The end





The skip is loaded by hand and the light truck backed up to it. Two chains are fastened to a crosspiece under the skip by links or rings; the end of the skip rides against a tail piece on the truck and is supported by a wire rope

of the skip supported by a single wire rope with a hook from a separate pulley simply rides against a tail piece on the truck.

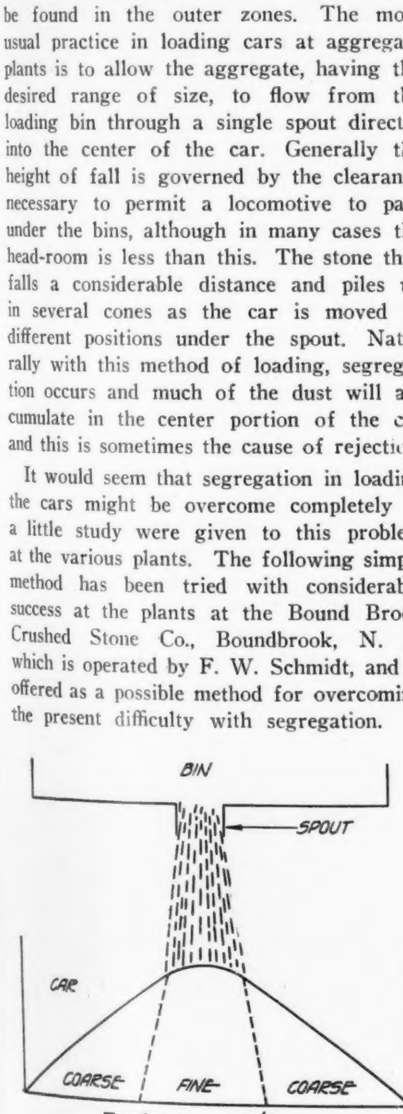
The skips are hand-loaded and it is but the work of a few minutes to back the truck up to a loaded skip and fasten on the chains and rope. The load, as can be seen from the views, is pretty well back and at times the front wheels of the truck are lifted off the ground. To dump the skip it is only necessary to take up on all the suspension chains and ropes.

The skips hold about 1700 lb. each and are loaded by hand. The haul from quarry to crusher is about 300 ft., so that 150 tons per day with one truck and two skips prove the device to be really efficient. It has been patented by Mr. Larner.

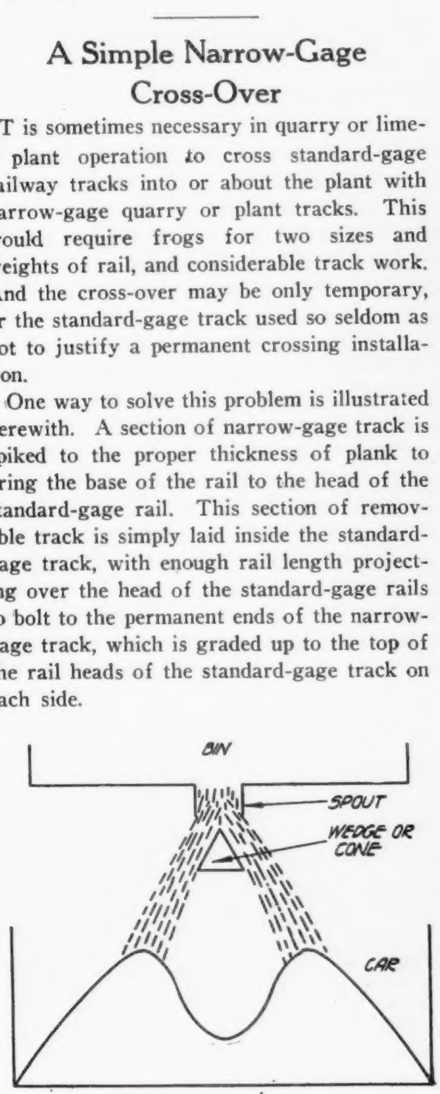
Controlling Segregation While Loading Cars

THE tendency of coarse aggregates to segregate is a well-known phenomenon. When aggregates, graded from fine to coarse, are piled by "coning" the center portion of the pile will contain most of the finest material and the coarsest pieces will be found in the outer zones. The most usual practice in loading cars at aggregate plants is to allow the aggregate, having the desired range of size, to flow from the loading bin through a single spout directly into the center of the car. Generally the height of fall is governed by the clearance necessary to permit a locomotive to pass under the bins, although in many cases the head-room is less than this. The stone thus falls a considerable distance and piles up in several cones as the car is moved to different positions under the spout. Naturally with this method of loading, segregation occurs and much of the dust will accumulate in the center portion of the car and this is sometimes the cause of rejection.

It would seem that segregation in loading the cars might be overcome completely if a little study were given to this problem at the various plants. The following simple method has been tried with considerable success at the plants at the Bound Brook Crushed Stone Co., Boundbrook, N. J., which is operated by F. W. Schmidt, and is offered as a possible method for overcoming the present difficulty with segregation. It merely requires the use of a dividing wedge or cone which will break up the stream into two streams if a wedge is used, or into an annular stream if a cone is suspended in the center line of the spout. This method will be very inexpensive to operate and seems worth while trying out.—*N. C. S. A. Bulletin No. 4.*

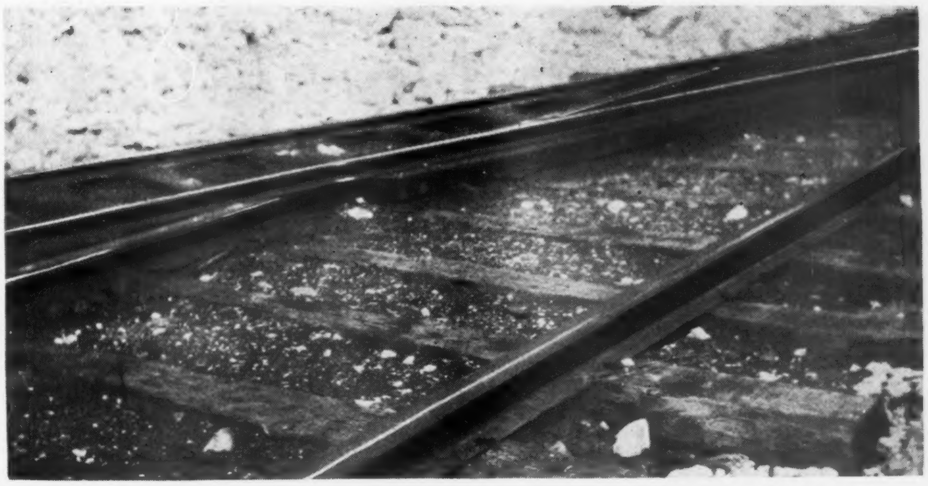


THE PREVALENT METHOD OF LOADING CARS



A SUGGESTED METHOD OF LOADING CARS

A Simple Narrow-Gage Cross-Over


Narrow-gage cross-over without the use of frogs

IT is sometimes necessary in quarry or lime-plant operation to cross standard-gage railway tracks into or about the plant with narrow-gage quarry or plant tracks. This would require frogs for two sizes and weights of rail, and considerable track work. And the cross-over may be only temporary, or the standard-gage track used so seldom as not to justify a permanent crossing installation.

One way to solve this problem is illustrated herewith. A section of narrow-gage track is spiked to the proper thickness of plank to bring the base of the rail to the head of the standard-gage rail. This section of removable track is simply laid inside the standard-gage track, with enough rail length projecting over the head of the standard-gage rails to bolt to the permanent ends of the narrow-gage track, which is graded up to the top of the rail heads of the standard-gage track on each side.

Of course, it is unnecessary to remove the portable section of narrow-gage track, when the standard-gage track is to be used; it is only necessary to unbolt the ends and swing the section enough for the rails to clear.

Neat Outlet for Waste Water

THIS is not so much of a "hint" as it is a good detail of plant construction. Ordinarily, especially in the smaller plants, any old way seems the right way to get the waste water from the plant to the pond. One sees old pipe, troughs and ditches used singly and in combination and the stopping of a pipe or a ditch often means some delay before it is cleared out.


Concrete pipe running under loading track carries waste water away from plant

In this case the waste water is brought from the plant in concrete pipes which are put under the track as a culvert. The ground along the track is protected by having wings to carry the flow out into the pond. When the pond becomes filled so that the settled solids near the pipe begin to choke off the flow, more pipe will be laid.

The pipe is big enough so that if there is a very large obstruction a man can crawl into the pipe and remove it. Being of concrete it will neither rust as an iron pipe would nor rot out as a wooden box would.

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

(These are the most recent quotations available at this printing. Revisions, corrections and supplemental information will be welcomed by the editor.)

Stock	Date	Par	Price bid	Price asked	Dividend rate
Alpha Portland Cement Co. (common)[2] new stock	Aug. 2	No par	43½	45½	1½% quar. Apr. 3
Alpha Portland Cement Co. (preferred)[2]	Aug. 2	100	115	....	1¾% quar. Mar. 1
Arundel Corporation (sand and gravel—new stock)	Aug. 3	No par	35	35½	45c qu., 15c ext. July 1
Atlantic Gypsum Products Corp.[10]	Aug. 2	100	99½	101	
Atlas Portland Cement Co. (common)[2]	Aug. 2	No par	45	47	50c quar. June 1
Atlas Portland Cement Co. (preferred)	....	100	....	....	2% quar. Oct. 1
Atlas Portland Cement Co. (preferred)[2]	Aug. 2	33⅓	43	46	2% quar. July 1
Beaver Portland Cement Co. (1st Mort. 7's)[8]	July 29	100	100	100	
Bessemer Limestone and Cement Co. (common)[4]	July 30	100	130	135	1½% quar. June 30
Bessemer Limestone and Cement Co. (preferred)[4]	July 30	100	106½	108	1¾% quar. June 30
Bessemer Limestone and Cement Co. (convertible 8% notes)[4]	July 30	....	118	145	8% annual
Boston Sand and Gravel Co. (common)[16]	July 30	100	63	....	2% quar. July 1
Boston Sand and Gravel Co. (preferred)[10]	Aug. 3	....	....	85	1¾% quar. July 1
Boston Sand and Gravel Co. (1st preferred)[10]	Aug. 3	....	....	95	2% quar. July 1
Canada Cement Co., Ltd. (common)	Aug. 3	100	105	100	1½% quar. July 16
Canada Cement Co., Ltd. (preferred)[11]	July [illegible]	100	114	115	1¾% quar. Aug. 16
Canada Cement Co., Ltd. (1st 6's, 1929)[11]	July 30	....	102	103	3% semi-annual A&O
Canada Crushed Stone Corp., Ltd. (6½s, 1944)[11]	July 30	100	93	96	
Charles Warner Co. (lime, crushed stone, sand and gravel)	July 31	No par	22½	24½	50c quar. July 12
Charles Warner Co. (preferred)	July 31	100	99¼	103	1¾% quar. July 22
Charles Warner Co. (lime, crushed stone, sand and gravel) 7s, 1929[16]	July 30	100	102½	104	
Cleveland Stone Co. (new stock)	Aug. 2	....	59	60⅛	1½% quar., June 1, 1% ex. June 1
Connecticut Quarries Co. (1st Mortgage 7% bonds)[17]	July 30	100	104	....	
Consolidated Cement Corp. (1st Mort., 6½s, series A)[24]	Aug. 4	....	95	98½	
Consolidated Cement Corp. (5 yr. 6½% gold notes)[24]	Aug. 4	100	98	100	
Consumers Rock and Gravel Co. (1st Mort. 7s)[18]	July 29	100	99	101½	
Dexter Portland Cement Co. (6% serial bonds, 1935)[23]	July 30	....	99½	100½	
Dolese and Shepard Co. (crushed stone)[7]	Aug. 4	50	90½	92	$1.50 quar. July 1, $1 ex. July 1
Egyptian Portland Cement Co. (7% pfd. with com. stock purchase warrants)[21]	June 21	....	97	101	1¾% quar. July 1
Egyptian Portland Cement Co. (common)[21]	June 21	....	18	20	40c quar. July 1
Egyptian Portland Cement Co. (warrants)[21]	June 21	....	10	15	
Giant Portland Cement Co. (common)[2]	Aug. 2	50	57	61	
Giant Portland Cement Co. (preferred)[25]	Aug. 2	50	54	57	3½% s.-a. June 15
Ideal Cement Co. (common)	Aug. 3	No par	71	72	$1 quar. July 1
Ideal Cement Co. (preferred)[6]	July 31	100	107½	109½	1¾% quar. July 1
International Cement Corporation (common)	Aug. 3	No par	53⅜	54¾	$1 quar. June 30
International Cement Corporation (preferred)[2]	Aug. 3	100	104½	104½	1¾% quar. June 30
International Portland Cement Co., Ltd. (preferred)	Mar. 1	....	30	45	
Kelley Island Lime and Transport Co.	Aug. 2	100	122	131	$2 quar. July 1
Lawrence Portland Cement Co.[2]	Aug. 3	100	100	110	2% quar.
Lehigh Portland Cement Co.[6]	Aug. 2	50	84½	86½	1½% quar.
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, 1927 to 1931)[13]	July 30	100	99½	100½	
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, 1931 to 1935)[13]	July 30	100	97	99	
Marblehead Lime Co. (1st Mort. 7's)[14]	July 23	100	103	106	
Marblehead Lime Co. (5½% notes)[14]	July 23	100	97½	100	
Michigan Limestone and Chemical Co. (common)[6]	Aug. 2	....	24	26	
Michigan Limestone and Chemical Co. (preferred)[6]	Aug. 2	....	23	25	1¾% quar. July 15
Missouri Portland Cement Co.	Aug. 3	25	57½	58	50c quar. Aug. 1, 25c ex. Aug. 1
Monolith Portland Cement Co. (common)[9]	July 29	....	11	11½	
Monolith Portland Cement Co. (units)[9]	July 29	....	27	28	
Monolith Portland Cement Co. (preferred)[9]	July 29	....	8	8¼	
Nazareth Cement Co.[26]	July 30	No par	39	40	75c quar. Apr. 1
Newaygo Portland Cement Co.[1]	July 30	....	117	....	
New England Lime Co. (Series A, preferred)[14]	Jan. 29	100	96½	99	
New England Lime Co. (Series B, preferred)[22]	Aug. 3	100	92	96	
New England Lime Co. (V.T.C.)[22]	Aug. 3	....	35	38	
New England Lime Co. (6s, 1935)[14]	July 30	100	99	101	
North American Cement Corp. 6½s 1940 (with warrants)	Aug. 3	100	99	99	
North American Cement Corp. (units of 1 sh. pfd. plus ½ sh. common)[19]	July 30	....	94	99	2 mo. period at rate of 7%
North American Cement Corp. (common)[19]	July 30	....	18	20	
North American Cement Corp. (preferred)	Dec. 31	....	....	....	1.75 quar. Aug. 1
Pacific Portland Cement Co., Consolidated[5]	July 29	100	75	78	½% mo.
Pacific Portland Cement Co., Consolidated (secured serial gold notes)[5]	July 29	....	99	100	3% semi-annual Oct. 15
Peerless Portland Cement Co.[1]	July 30	10	5¾	6¼	
Petoskey Portland Cement Co.[1]	Aug. 3	10	9¼	9⅞	1½% quar.
Rockland and Rockport Lime Corp. (1st preferred)[10]	July 31	100	101	103	3½% semi-annual Aug. 2
Rockland and Rockport Lime Corp. (2nd preferred)[10]	July 31	100	....	....	3% semi-annual Aug. 2
Rockland and Rockport Lime Corp. (common)[10]	Aug. 2	No par	50	50	1½% quar. Nov. 2
Sandusky Cement Co. (common)[1]	Aug. 3	100	124	135	$2 quar. Apr. 1
Santa Cruz Portland Cement Co. (bonds)[5]	July 29	....	105½	106	6% annual
Santa Cruz Portland Cement Co. (common)[5]	July 29	50	80	....	$1 quar. $1 ex. Dec. 24
Superior Portland Cement, Inc. (Class A)[20]	July 30	....	42¼	43	
Superior Portland Cement, Inc. (Class B)[20]	July 30	....	20	21	
United Fuel and Supply Co. (sand and gravel) 1st Mort. 6s[27]	July 16	100	98	100	
United Fuel and Supply Co. (sand and gravel) 6% gold notes[27]	July 16	100	96	99	
United States Gypsum Co. (common)	Aug. 3	20	168½	170¼	2% quar., $1 ex. May 31
United States Gypsum Co. (preferred)	Aug. 3	100	121	121	1¾% quar. June 30
Universal Gypsum Co. (common)[3]	Aug. 4	No par	14¼	15¼	
Universal Gypsum V.T.C.[3]	July 21	No par	14½	15½	
Universal Gypsum Co. (preferred)[3]	Aug. 4	....	71	73½	1¾% quar. Sept. 15
Universal Gypsum Co. (1st Mortgage 7% bonds)[3]	Aug. 4	....	99	(at 6½%)	
Union Rock Co. (7% serial gold bonds)[18]	July 29	100	99	101½	
Wabash Portland Cement Co.[1]	Aug. 3	50	60	100	
Wisconsin Lime and Cement Co. (1st Mort. 6s, 1940)[15]	Aug. 4	100	98½	100	
Wolverine Portland Cement Co.	Aug. 2	10	6	6	2% quar. Aug. 15

[1]Quotations by Watling, Lerchen & Co., Detroit, Mich. [2]Quotations by Bristol & Willett, New York. [3]Quotations by True, Webber & Co., Chicago. [4]Quotations by Butler, Beading & Co., Youngstown, Ohio. [5]Quotations by Freeman, Smith & Camp Co., San Francisco, Calif. [6]Quotations by Frederic H. Hatch & Co., New York. [7]Quotations by F. M. Zeiler & Co., Chicago, Ill. [8]Quotations by Ralph Schneeloch Co., Portland, Ore. [9]Quotations by A. E. White Co., San Francisco, Calif. [10]Quotations by Lee, Higginson & Co., Boston and Chicago. [11]Nesbitt, Thomson & Co., Montreal, Canada. [12]E. B. Merritt & Co., Inc., Bridgeport, Conn. [13]Peters Trust Co., Omaha, Neb. [14]Second Ward Securities Co., Milwaukee, Wis. [15]Central Trust Co. of Illinois, Chicago. [16]J. S. Wilson Jr. Co., Baltimore, Md. [17]Chas. W. Scranton & Co., New Haven, Conn. [18]Dean, Witter & Co., Los Angeles, Calif. [19]Hemphill, Noyes & Co., New York. [20]Quotations by Bond & Goodwin & Tucker, Inc., San Francisco. [21]Baker, Simonds & Co., Inc., New York. [22]William C. Simons, Inc., Springfield, Mass. [23]Blair & Co., New York and Chicago. [24]A. B. Leach and Co., Inc., Chicago. [25] A. C. Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [27]J. G. White and Co., New York.

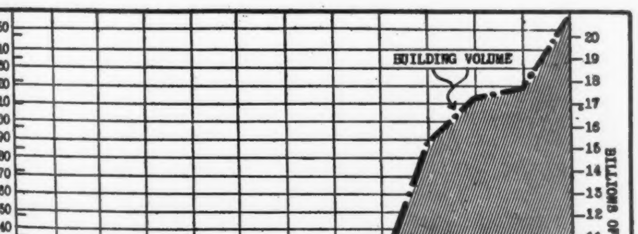
QUOTATIONS ON INACTIVE ROCK PRODUCTS CORPORATION SECURITIES ON PAGE 76

Editorial Comment

"Say It With Brick-Bats"

Can the clay industry "Say it with Flowers"? asks our worthy and esteemed contemporary, *Brick and Clay Record,* in suggesting various trade-promotion slogans. Not a few readers of ROCK PRODUCTS would doubtless like to "say it" *to the common clay brick industry* with flowers, for they know well enough that whether it is the adopted slogan of the common clay brick industry or not it has long been practicing "Say it with brick-bats." The latest instance of this was at the recent annual convention of the American Society for Testing Materials when a surreptitious attempt to adopt a definition of "brick" as a *clay* brick was made. Fortunately, so far as the American Society for Testing Materials is concerned, it is for its committee on nomenclature to determine such definitions, and the clay brick industry will have difficulty with this, for it is an impartial committee.

This particular incident is recalled only because it is the most recent of a long series of a similar character by which the clay brick industry has attempted by every possible means to put over the idea that "if it isn't clay, it isn't a brick." Fortunately the cement products bureau of the Portland Cement Association and the Sand-Lime Brick Association have been too wide awake to let



An analysis of the common clay brick industry by "Brick and Clay Record" to prove that the industry is "slipping"—the increase in the volume of building having far outdistanced the increase in the use of clay brick

the clay brick industry thus hoodwink the American public.

Unfortunately these tactics are typical of the methods by which the clay brick industry has attempted to meet competition. It has, it would seem, been far more concerned with knocking "imitation" brick and brick "substitutes" than in making known any particular virtues that clay brick may have. Also, through questionable political methods the clay brick interests, aided or not by their national organization, have been able so to influence the writing of building codes as to get and maintain unfair advantages over competitive materials, and unable to maintain their advantage in another way have in at least one great American city resorted to nefarious alliances with corrupt union labor officials to shut out competitive materials by threats of strikes and violence.

As, of course, every man with a conscience, and with a knowledge of what constitutes real success, knows, such methods have ever resulted in the long run in a constant loss of the public's good will and of the industry's prestige. In the case of the brick industry it has filled the columns of our worthy contemporary with the echoes of the "belly-aching" wails of the brick industry on "conditions," which apparently prove the industry is constantly slipping, even in its own estimation.

Altogether we believe the clay brick industry presents as good an example of *how not to do* trade promotional work as the Portland Cement Association presents an illustration of *how to do* it. Sometimes we derive as much profit from studying the methods of the one as of the other.

Government in Business

A good deal of the argument over the operation of the South Dakota state cement plant seems to be as to whether or not it is making a profit. To our mind this has little bearing on the main issue. It is easily conceivable that temporarily the plant could show a profit—that under at least one gubernatorial administration it could have efficient management—even though present paper profits may be merely a matter of bookkeeping. The main issue is that to entrust the management of a $2,000,000 enterprise to politicians, who are in again and out again, wholly irrespective of their merits, or demerits, is illogical and economically unsound and unjustifiable.

No intelligent man would voluntarily invest his savings in a savings bank or any privately owned enterprise so managed; why then should he be compelled to be an investor in a state enterprise so managed? Unfortunately there are some necessary services to society such as the operation of prisons and poorhouses, which apparently offer no substitute for government ownership and operation. The mounting tax rates in every American community reflect the result of irresponsible and indifferent management of these; but what reason is there to extend the opportunity for political mismanagement beyond these necessarily governmental services?

Farmers, lawyers, physicians, storekeepers, etc., are

often quite easily persuaded that the government should engage in the manufacture of portland cement, or gravel, or something else they have no interest in; but suggest to them that the government should take over the farms, and the stores, and the professional practice of law and medicine, merely hiring and firing them as it pleased some politician in power to do, and even these farmers, lawyers, physicians, storekeepers, etc., object to government management and ownership. Certainly any man engaged in production and manufacture needs no further demonstration than he has already had.

Every thinking man knows that our American prosperity, prestige and even our very character as a national type, are the direct result of our individualism——our wide-open door to opportunity, the unrestricted initiative to exercise our talents in whatsoever direction they best serve the interests of the community and ourselves. Every thinking man knows that clean business competition is not only "the life of trade," but the joy of doing business. Substitute government owned and operated monopolies, and put political drag in place of merit, initiative, business ability and efficiency, and imagine what satisfaction there would be in this world for red-blooded, independent, self-respecting individuals.

Consolidated Rock Products Bonds Offered

FARSON, SON AND CO., New York, are offering at 100 and interest $250,000 first mortgage 7% serial gold bonds of the Consolidated Rock Products Co., Lakeland, Fla., dated May 1, 1926. Interest payable semi-annually at the National City Bank, New York. Redeemable after March 1, 1927, at 105 in whole but not in part. Guaranteed as to principal and interest by the Independence Indemnity Co., Philadelphia, Penn. Trustee, Citizens' Bank and Trust Co., Tampa, Fla.

The following is from a letter from W. P. McDonald, president of the company, under date of June 25:

The Consolidated Rock Products Co., of Lakeland, Polk County, Florida, a Florida corporation, owns two stone quarries, with complete modern stone-crushing equipment. Plants are located—one in Brooksville, Hernando County, Florida, and the other adjacent in Sumter county.

These properties are located approximately 43 miles north of the seaboard city of Tampa, Florida, and are connected with this city by modern hard-surfaced roads and by the Atlantic Coast Line Railroad.

The plants are fully equipped with all necessary machinery of the most modern kind which is electrically operated. Power is purchased on favorable long term contract from the Florida Power Corporation and an ample supply of labor is available at satisfactory wages.

From these quarries is produced both hard and soft rock, used for road construction purposes, concrete aggregate and railroad ballast. The capacity of both plants is approximately 1,800 tons of rock per day. There is a ready market demand far in excess of the output. These properties have been examined and appraised by Frederick L. Smith, industrial engineer, 21 East 40th Street, New York City, who reports there is sufficient rock available for over 20 years' operations. He further comments on the inexpensive operations of these properties due to the location of the rock close to the surface, the low freight rates and excellent transportation facilities.

CAPITALIZATION

Funded Debt	Authorized	Outstanding
(7%) first mortgage bonds (this issue)	$250,000	$250,000
Capital stock	250,000	100,000

Security and Appraisals—These bonds are a first mortgage (closed) on the entire property and equipment, owned by the company which was appraised by Frederick L. Smith on April 1, 1926, as having a sound valuation of $985,100.84. In addition, valuable real estate is owned which he appraises at $25,000. The security for these bonds, therefore, is conservatively estimated at over four times the entire outstanding bonded indebtedness.

Earnings—One quarry and stone-crushing plant is in operation at the present time. The other property is expected to be in operation by July 1 this year. The net earnings according to estimate of Frederick L. Smith should equal at least $185,000 per year, or at the rate of over ten times interest charges.

Purpose of Issue—The proceeds of these bonds are to be used for purchase of machinery, supplies, railroad sidings, and various corporate expenses.

Sinking Fund—A monthly sinking fund is provided under the mortgage as follows:

$3,000 monthly May 15, 1926, to April 15, 1927, inclusive; $4,500 monthly May 15, 1927, to April 15, 1928, inclusive; $5,000 monthly May 15, 1928, to April 15, 1931, inclusive, and $4,250 monthly May 15, 1931, to April 15, 1932, inclusive.

Six thousand dollars ($6,000) has already been deposited with the trustee.

Provisions of the Issue—The bonds are dated May 1, 1926 and mature as follows: $50,000 May 1, 1928; $50,000 May 1, 1929; $50,000 May 1, 1930; $50,000 May 1, 1931; $50,000 May 1, 1932. Redeemable after May 1, 1927, at 105, in whole but not in part.

Management—The management consists of William P. McDonald, of the William P. McDonald Construction Co., New York City. His experience covers more than 30 years in the construction line including 10 years' experience in road building in Florida. John E. Ballenger, formerly city engineer of Jacksonville, Fla., and other experienced business men are associated with the management.

North American Cement Earnings

THE North American Cement Corp., Albany, N. Y., reports for the quarter ended June 30, 1926, profit of $431,063 after depreciation and depletion, but before interest, amortization and federal taxes. The earnings for the first quarter ended March 31 were $105,478.

QUOTATIONS OF INACTIVE ROCK PRODUCTS SECURITIES

Stock	Date	Par	Price bid	Price asked	Dividend rate
Coplay Cement Mfg. Co. (common) (4)	Dec. 16	....	12½	....	
Coplay Cement Mfg. Co. (preferred) (1)	Dec. 30	....	70	....	
Eastern Brick Corp. 7% cu. pfd.) (1)	Dec. 9	10	40c	....	
Eastern Brick Corp. (sand lime brick) (common) (1)	Dec. 9	10	40c	....	
Edison Portland Cement Co. (common)	Nov. 3	50	7½c(x)	....	
Iroquois Sand & Gravel Co., Ltd. (2 sh. com. and 3 sh. pfd.) (1)	Mar. 17	....	$12 for the lot	....	
Edison Portland Cement Co. (preferred)	Nov. 3	50	17½c(x)	....	
Lime and Stone Products Co. (1100 sh. pfd., $10 par and 700 sh. com., $10 par)	Feb. 10	....	$66 for the lot	....	
Missouri Portland Cement Co. (serial bonds)	Dec. 31	....	104¾	104¾	3¼% semi-annual
Olympic Portland Cement Co. (g)	Oct. 13	....	....	£1⅝	
Phosphate Mining Co. (1)	Nov. 25	....	1@5	....	
Pittsfield Lime and Stone Co. (preferred)	....	100	....	....	2% quar. Apr. 1
River Feldspar and Milling Co. (50 sh. com. and 50 sh. pfd.) (1)	June 23	....	$200 for the lot		
Rock Plaster Corp. (390 sh. com., no par) (1)	Mar. 17	....	$12 for the lot	....	
Simbroco Stone Co. (pfd.)	Dec. 12	....	....	....	$2 Jan. 1
Tidewater Portland Cement Co. (common) (3)	Nov. 25	....	8½	....	
Vermont Milling Products Co. (slate granules) 5 sh. pfd. and 1 sh. com. (2)	Dec. 30	....	$1 for the lot	....	
Winchester Brick Co. (preferred) (sand lime brick) (5)	Dec. 16	....	10c	....	

(g) Neidecker and Co., Ltd., London, England. (1) Price obtained at auction by Adrian H. Muller & Sons, New York. (2) Price obtained at auction by R. L. Day and Co., Boston. (3) Price obtained at auction by Weilepp-Bruton and Co., Baltimore, Md. (4) Price obtained at auction by Barnes and Lofland, Philadelphia, Pa. (5) Price obtained at auction for lot of 50 shares by R. L. Day and Co., Boston, Mass. (x) Price obtained at auction by Barnes and Lofland, Philadelphia, on November 3, 1925.

Tax-Supported Plant Is Costly Venture

"The State in Business"—Being One of a Series of Articles Current in the New York "Commercial"

By Ralph E. Duncan

THE State of South Dakota is manufacturing portland cement on a large scale in a tax-supported cement plant that is one of the most costly of its kind to maintain in the entire United States, provided all the expenses of the business are charged against the earnings of the plant. This statement will doubtless be challenged and an array of figures produced to refute it. The state cement commission, it is true, has published earning statements which show the plant to be operating at a profit. Opponents of the project on the other hand are equally certain that the plant is costing the state more than it earns. There are figures to support either view, depending upon which particular system of political arithmetic one may prefer to use. Both sides start with the same set of figures and both are right in their contentions, according to their respective methods of calculating profits and losses.

The state cement plant is one of the most widely advertised institutions in South Dakota. The question of whether the plant is losing money or paying profits is a subject of general controversy. Like the abandoned state gasoline business, which came into existence because a former governor had decreed the state should conduct a "gasoline price war," the state cement plant was established for the purpose of carrying on a price war against the portland cement industry. The "cement price war" is now in its second season. Cement manufactured by the South Dakota government is advertised and offered for sale today at cut-rate prices in four other states.

Tax Levy Authorized

The wherewithal to finance the "cement price war" has been provided by means of an annual tax levy. The state legislature has authorized the payment of principal and interest on $2,000,000 of cement plant bonds by taxation. No part of this expense is borne by the cement plant. In addition to this obligation the credit of the taxpayers has been placed behind the plant to guarantee the payment of any deficits from operation, and authority has been conferred upon the managers of the project to borrow money in the name of the state to finance production whenever the need may arise. The state constitution too has been amended to legalize this form of lien against the public treasury, and a sufficient number of votes mustered at the polls to give the enterprise the stamp of popular approval.

If legislation and votes could take the place of practical knowledge, business brains and sound engineering practice in the erection and operation of manufacturing plants, the tax-supported cement plant of the South Dakota government would be in a fair way to dominate the market for portland cement in several states. Nearly every form of legislative aid which a government may reasonably bestow upon a subsidized enterprise has been given to the state cement plant by the legislature.

Editors' Preface

THIS is one of a series of articles that has aroused widespread comment and commendation. This series is part of the campaign of the New York "Commercial" to illustrate "Government in Business"; and this campaign is designed to open the eyes of business men to the schemes and progress of advocates of "nationalizing" industry.

We are glad to give space to it, since it very well supplements our own editorial efforts. The rock products industries in particular have been the objects of state, county and municipal mis-directed enterprise; chiefly, we presume, because public authorities are large users of these materials for public works, and because there has been less resistance to overcome in getting into these industries than some others.

There are now two state-owned cement plants in operation (South Dakota and Michigan) and numerous state, county and municipal quarries and gravel pits. There is now available for use in the State of Illinois for building a state cement plant, quarry and gravel plants, a sum of several million dollars, and numerous mid-west state legislatures either have debated, or now have under consideration appropriations for state cement plants.

Hence it behooves every reader of this article to use his influence as a citizen and business man to resist all these efforts aimed at the American individualism that is responsible for our national Declaration of Independence and our growth and prosperity as a nation ever since.—The Editors.

Endangers Capital Investment

Selling cement at less than the cost to produce and market it has proved to be a more complicated problem than the marketing of gasoline by the state below cost. In the case of the now defunct gasoline business the state was a retailer, whereas in the matter of cement the state is a manufacturer. South Dakota taxpayers have a large capital investment in the cement plant which they did not have in the gasoline business. The sale of gasoline by the state at less than cost meant simply a trading loss on each gallon, the capital investment being relatively small. A similar loss in the sale of cement, however, would mean not only an operating deficit, under the same circumstances, but it would also endanger the $2,000,000 capital investment of the state.

The failure of the sister enterprises which were intended to benefit by the price policy first announced left the state in an awkward position. The only remaining outlet for its cement was the dealer trade in South Dakota and nearby states.

Enters Outside Market

The South Dakota market was neither large enough nor near enough to absorb the full output of the plant. It was therefore decided to enter the territory of the "foreign and insidious" forces in the cement business outside South Dakota and to engage in competition with the privately owned plants in those states. In the circumstances it was obvious the South Dakota taxpayer would not willingly furnish capital for a plant which was to be operated at their expense while selling cement at reduced prices in other states. It was agreed that the business must be made to earn a profit if possible, and the project given a fair trial at least before deciding on more drastic action.

The fact that the plant is now reported to be operating at a profit would make it appear that the basing price fixed by the state has proved adequate to cover not only the manufacturing cost but other expenses as well. But here is the catch. A large proportion of the selling and administrative expense is absorbed by other departments of the state government and is not charged to the plant, not to mention the payment of

principal and interest on the cement plant bonds by taxation.

When the state lost its principal outlet for cement through the abandonment or failure of other tax-supported enterprises, it became urgently necessary to establish an emergency selling organization. The cement plant had already cost in excess of the $2,000,000 bond issue and had begun operating on "borrowed" capital obtained from the legislature by a special appropriation.

State "Inspectors" Sell Cement

The problem of selling the cement at once overshadowed all other questions. Something needed to be done quickly or the plant would have to be shut down in the middle of the first season of operation. This was politically unthinkable. Yet the state had no funds with which to maintain a sales organization large enough to cover the territory in which the product must be distributed. The problem was happily solved, however, by putting the job up to other departments of the government.

Eleven traveling inspectors from various state bureaus were detailed to call upon the three hundred leading building material dealers in the state. Food inspectors, sanitary inspectors, livestock inspectors and other state employes were drafted into the service of the cement plant. Peddling cement has now become a regular part of their duties. Their traveling expenses and salaries, however, are paid out of the appropriations of their respective departments and bureaus, no part of their time or expenses being charged against the state cement business. The saving in expense thus made possible to the cement plant has enabled the management to employ its funds to pay the salaries and expenses of salesmen in other states, where they offer to non-resident dealers the product of a tax-endowed cement plant which cannot pay its own expenses.

A larger number of persons employed in other state offices are now performing some class of service for the cement plant than are actually employed in the administrative and selling organization of the cement business. There are other ways also of cutting down costs. For example, a cost accounting system—something which every industrial plant should provide for itself—has recently been installed under the direction of an accountant from the office of the state auditor and at the expense of that department. Money has been "loaned" to the plant by the legislature on which the plant pays no interest. Borrowing the taxpayers' money is cheaper than borrowing through regular commercial channels. South Dakota taxpayers are noted for being very cheerful in giving the state the use of their money.

Price Exceeds Average

After shifting all its bonded debt and interest charges to the taxpayers, and after eliminating a large proportion of the selling expense and overhead by shifting it to other state departments, the state plant has established a mill price for cement which is higher than the average mill price in five leading cement producing states. The basing price or mill price of the South Dakota plant is $1.80 per barrel. A discount of 10 cents a barrel is allowed for 30 days' payment.

The average mill prices of the six principal producers in the states of Pennsylvania, Indiana, Minnesota, Texas and California, as published by the United States Bureau of Labor Statistics, is $1.75. These plants pay their own selling expenses in full, and fixed charges, interest on loans, taxes and administrative overhead, and then sell cement cheaper than the politically managed plant in South Dakota, which pays only a portion of its own expense.

Resorts to "Dumping"

The state has recently decided to seek an outlet for its surplus production by offering cement in the Minneapolis market at a heavy discount. This is known in the trade as "dumping." The cement plant is confronted with the problem of finding an outlet for its surplus product, or, as an alternative, shutting down the plant before the end of the season. A long shutdown period means heavy expense and high manufacturing cost. The policy of "dumping" the surplus was decided upon by the management at the opening of the 1926 season as the lesser of two evils. The taxpayer, as usual, stands the loss in either event.

The State Cement Commission formerly boasted that the South Dakota state cement plant was one of the most economical in the country. The earnings reported for the 1925 season, however, were less than the amount of the interest on the cement bonds, even after eliminating that portion of the overhead and selling expense which is absorbed in the appropriations of other state departments. One tax levy has been made and another will soon follow. Whether the plant is economical and whether it is earning profits may indeed be a live political issue, but as a business proposition there is nothing to it.

"A Grievous Failure in Public Ownership"

The state-owned cement plant of South Dakota, which is now doing business at the expense of the taxpayers of that excessively governed commonwealth, presents one of the most grievous examples of failure in the history of public ownership. The state government for business reasons does not as yet admit this to be the fact. The newly built plant had no sooner been put in operation, however, than it became all too apparent that the early estimates of manufacturing costs, shipments and selling prices were grossly in error. The project had virtually failed before the first carload of cement had been moved, so far as all the earlier plans of the state were concerned. To have succeeded with the sales program and production schedule that had been agreed upon in the beginning would have hastened disaster and caused excessive financial losses.

The state was confronted with the disagreeable duty of devising ways and means to salvage its $2,000,000 investment in machinery and structures, or, if possible, to turn failure into success. All that saved the situation in the initial stages of operation was the prompt action of the legislature of 1925 in authorizing an emergency appropriation to provide temporary working capital for the insolvent enterprise. It was evident the conquest of the cement market must be attempted along other lines.

Adopt New Sales Policy

In order to protect the investment of the state it was agreed to keep the plant in operation despite the miscarriage of plans rather than abandon the project and admit defeat. The present sales policy was decided upon at the same time as an emergency measure in hopes the business might still be made to pay its way.

The "cement price war" is now in full swing. The state is carrying the fight into enemy territory in the effort to establish an outlet for the surplus production of the new plant. The tax-made product of the cement mill at Rapid City, S. D., is now being offered to the dealer trade in the four states of Nebraska, Wyoming, Montana and Minnesota at prices in some cases from 15% to 25% less than it costs the state to manufacture cement and pay the charges for interest and sinking fund, selling expense and administrative overhead. In the meanwhile the South Dakota government is making itself a general nuisance to the legitimate manufacturing companies and investors of neighboring states.

The "price war" has reached the stage where "dumping" apparently has been deemed necessary if the state plant is to be kept running without undue curtailment of operations. Cement from the politically managed plant in the Black Hills is finding its way to the Twin Cities, where it is offered in competition with the lower priced cement of other producers, according to recent trade reports on cement shipments. The state pays a higher freight rate to Minneapolis and St. Paul than its competitors because of the longer haul. The Rapid City plant must therefore absorb a loss on all sales in this market. The fellow who finally pays the loss is the much taxed South Dakota citizen whose money is being used to support the "cement price war."

Unfair Practices Charged

The campaign now being carried on by the South Dakota government to drive the product of privately owned cement plants out of the state was instigated in 1917 while the United States was at war. The closing down of two small cement plants, located in the southeastern section of the state, prior to that time, was presumably the reason for the agitation. The closing down of these plants was publicly decried as an attack upon the honor and integrity of the state by outside interests in the cement industry. Politicians

and newspapers took up the cry and it was not long before the public apparently had become convinced that South Dakota had been made the victim of a vicious and illegal trade conspiracy.

There were no charges brought in any court and no evidence brought before any agency of the state or Federal governments to bear out the allegations that unfair or unlawful influence had compelled the closing of the plants. On the contrary, the first State Cement Commission in its report to the legislature admitted the real reason for the failure of these projects. The report of the commission states the matter as follows:

That we found the chalk rock along the Missouri was of an inferior quality and undoubtedly the Yankton and Chamberlain plants were abandoned on that account.

The commission, nevertheless, recommended in the same report that a cement plant be built in the vicinity of Rapid City, near the western boundary of the state. The idea had seized upon the imagination of the public as a quick and easy means of developing the resources of the state. A resolution proposing an amendment to the state constitution authorizing the state to undertake the manufacture and sale of cement had been submitted to popular vote by the legislature of 1917 and adopted by the voters at the election of 1918.

Project Approved

The legislature of 1919 voted a bond issue of $1,000,000 for construction of a cement plant and ordered an investigation of the available locations within the state where materials were obtainable for making cement. The investigation, as a matter of fact, had been undertaken without awaiting the action of the legislature by interested officials in the executive branch of the government.

The first state cement commission, headed by the governor, was organized in August, 1919. The commission went through the motions of investigating and analyzing the conditions then prevailing in the portland cement industry, and in December, 1920, published a report that is one of the most ingenious political documents ever presented to a legislature. The report said:

"The commission is unanimously of the opinion after a thorough investigation of the cement situation in the United States that there are not enough plants now in operation by 50% to furnish the cement that will be needed for building operations, street and road construction to supply the demand for the next five years.

"That with the prospective demand and use for cement in South Dakota within the next five years, we are of the opinion that a cement plant located at Rapid City would save the people of the state twice the cost of building the plant."

The cement commission either overlooked the fact, or omitted to mention it, that many cement plans were either idle or running at part capacity at the time the alleged investigation was made. The reports of the United States Department of Commerce and of the United States Geological Survey for that period show that from one-third to one-half of the manufacturing capacity of the industry had been idle during the years of 1918, 1919 and 1920, due to abnormal conditions in the industry growing out of the war. There was no reason to believe these plants would not soon resume business. At a time when other producers were curtailing operations in order to save needless expenditures during the period of price inflation, the South Dakota cement commission in the face of these facts took an opposite view of the situation and advised the legisltaure to double the amount of the bond issue it had previously authorized in order that a plant of greater capacity might be built. The legislature approved the proposition and increased the amount of the bond issue to $2,000,000.

Records Show Failure

The magnitude of the failure which has befallen the enterprise can only be realized when the promises of the government are compared with present performance.

The findings of the cement commission as reported to the legislature in 1921 gave estimates of the cost to the state of producing and selling cement. These estimates became the basis of the engineering and construction program which was carried forward during 1923 and 1924. Although the situation in the cement industry had completely changed during that time, the state went ahead with its preparations for the "price war" on the basis of estimates prepared during the inflation year of 1920. The state so to speak was "going it blind." The consequences of this haphazard policy have already been stated.

The official records of the cement commission tell the story of the misfortune that has befallen the state cement plant more forcibly than any other account that might be given of what has happened. The estimates prepared by the first state cement commission as a result of its investigations were summed up in the report of the commission as follows:

"The commission are convinced they can manufacture a cement which will be equal to the best, at a maximum price of $1.36 per barrel on the basis of the August, 1920, prices.

"That under efficient management a first class grade of cement could be manufactured in a state plant and delivered all over the state in proportion of one barrel per capita of population at $2.38 per bbl. f.o.b. destination. This estimate is based on figures compiled in August, 1920. Subsequent reductions in material and labor costs would show a substantial reduction from this price.

"That this cost delivered figure of $2.38 per bbl. includes a depreciation charge sufficient to maintain the plant perpetually in operating condition and a sinking fund charge sufficient to wipe out the investment in 20 years and an interest charge on the investment of 6% until such investment is liquidated."

When the state cement plant was at last completed and ready to operate it quickly became apparent that the proposed "maximum price of $1.36 per bbl." would fall far short of paying operating costs and other current expenses, not to mention interest and sinking fund charges. The price which the state cement commission had proposed to put into effect would have been confiscatory even for a state-owned business supported by public funds. Instead of forcing the cement manufacturers to adjust their prices, as some state officials had boasted they would do, the state was faced with the necessity of raising its own price.

The capacity of the plant as originally planned had been doubled to take care of the prospective needs of the state for cement, but the state was now the poorest customer in sight. The plans of the state fathers for construction of state-owned warehouses, elevators, public supply depots, filling stations, stockyards, power plants and transmission lines, hard-surfaced roads and other enterprises had come to a sudden standstill when the money chest had been emptied. In the meanwhile prices for portland cement had been declining all over the United States. Plants which had been closed or running at reduced capacity were now in operation and much new capacity had been provided. Cement was plentiful at prices much lower than in 1920. The state had to meet an unforeseen situation. It meant the infant state industry must fight for business throughout five or six states in competition with the private manufacturing companies in those states.

The "cement price war" took on a serious aspect for the first time. The state fathers were caught in a declining market with a 2,000-bbl.-a-day cement plant on their hands located at a maximum distance from markets in all directions. Something must be done and done quickly. The new plant would be glutted and forced to shut down at once if the finished cement were allowed to back up in the storage bins.

A sudden shift in sales policy was announced by the state. The state established a price of $1.80 a bbl. at the mill. This was the prevailing price at other mills in the region. A discount of 20 cents a bbl. temporarily was offered for immediate payment and 10 cents a bbl. discount for payment in 10 days, and 30 days net. The effect of this discount was to offer cement to dealers at 10 cents per bbl. less than the prices generally being asked by other producers.

Instead of paying its own interest and sinking fund charges, as the cement commission had promised, the new price made no provision for this expense. The sinking and interest fund charges up to the present have been met by a tax levy. Other state departments bear part of the sales expense. All in all, the state cement plant has cost the public a pretty penny. The plant produced only a little more than one-half its capacity in 1925. If any one knows a way for the state to market 2,000 bbl. of cement a day, South Dakota would like to hear from him.

New York State Crushed Stone Producers Meet at Utica

THE New York State Crushed Stone Association holds regular meetings on the fourth Friday of each month and in July the meeting was held at Utica. Arrangements were made by producers of Utica to entertain those who attended at the beautiful Yahnundasis Golf Club building, which is about four miles out of the city.

The members attending met at 10 a.m., but did not get down to business until lunch had been served. Then President Seitz called the meeting to order and ordered the minutes read. There was some business carried over from the previous meeting that next received attention. This had to do with the investigation of the report that a representative of an asphalt company had been spreading propaganda in favor of the use of gravel in asphalt paving. The matter was reported to have been adjusted. The report of the committee on standardization of stone sizes was brought up. This committee has reported to the National Crushed Stone Association that it is the desire of the state association to have not more than five sizes recognized as standard. James Savage, treasurer, reported as to the turning over of the funds collected under the pledges made to the association for the bureau of engineering of the national association. Secretary Schaefer reported that there were 39 producers in the state who had so far contributed nothing to this work, and it seemed to be the sense of the meeting that these producers should be asked to contribute, as the engineering work is of vital importance to the industry as a whole and not merely to those who are members of the state association.

An instance of reported failure of highway concrete, in which stone was used as the coarse aggregate, was reported. Investigation showed that the probable cause of the failure was due to the use of unwashed sand presumably containing organic matter.

Work of the National Association's Engineering Bureau

President Graves of the National Crushed Stone Association was present and he was invited to tell something of what the new engineering bureau was doing. He said that, naturally, most of the work so far had been of an organizing and a preliminary nature, but actual investigation work was now being undertaken. Mr. Goldbeck, the chief of the bureau, had published three new designs of bituminous pavement which had attracted a great deal of attention and several state highway departments had said that they would try out one or more of these designs on a stretch of road of sufficient length to prove their capabilities. These sections had been published in the *Crushed Stone Bulletin* and it was supposed that the members were familiar with them. In closing Mr. Graves brought up the matter of pledges and said he would like to see some method devised whereby contributions could be put on a permanent basis.

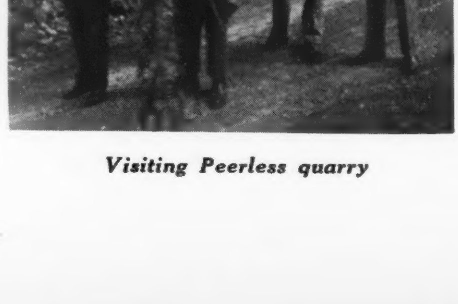
John Rice Gives Experience With Trucks in Quarries

John Rice of the General Crushed Stone Co. was asked by the president to give something of his experience with the use of motor trucks in quarries, in the place of tracks and locomotives for hauling stone from the steam shovel to the crushing plant. Mr. Rice said that motor trucks were operating in two of the quarries of the company and that he was well pleased with the results. The trucks had not been in service long enough to furnish very exact figures of cost, but for reasonable hauls (around 500 ft.) the cost was found to be a little less than with tracks and locomotives and the actual figures would lie somewhere between 4 and 5 cents per ton.

The equipment consisted of six Mack trucks of the heaviest type fitted with special end dump bodies. The advantages which might not be apparent at first sight were that the flow of stone to the primary crusher could be better controlled and that large stones could be more easily handled. But the great advantage lay in the extreme mobility of trucks in connection with caterpillar tread shovels. These trucks could go anywhere without waiting for the track to be shifted, the same as the shovels could. There was no lost time from shifting track or repairing track.

He said they had been somewhat uneasy at first as to the cost of tires for the trucks, but the present indications were that tires would give two years of service, which he considered satisfactory.

In answer to a question, Mr. Rice said that he was by no means ready to advise everyone to adopt the trucking system, but he thought that there were certain conditions under which trucks had decided advantages.



Visiting Peerless quarry

Trucks in One of the Schmidt Quarries

F. W. Schmidt, Jr. ("Bud" Schmidt), of the Buffalo Crushed Stone Co., and Morris County (N. J.) Stone Co. was asked to give his experience with the use of trucks in quarries. He said that he had found the use of 3½-ton chassis Autocars advantageous, as they could get in and out of narrow places. Trucking had been going on at one of his company's quarries for between three and four years, and he liked the truck system. They were now using a larger jaw crusher at this quarry, a crusher which would take the largest pieces that would go in the dipper of the shovel, and the truck was excellent for loading and conveying these large pieces. The haul was about 500 ft. and the shovel used was a Marion No. 37 with a 1½-yd. dipper. There was a saving of labor used to clean up spill as the spill was not so much in loading with trucks as with cars.

As to costs, it had been figured out that it cost $15 per day to keep a truck in service and that three trucks handled 1100 yd. daily. On a per ton basis, a truck could be conservatively counted upon to handle 400 tons per day (which would bring the cost to 3¾ cents per ton).

He spoke of the importance of getting good drivers who not only understood how to handle a truck in the quarry but also how to keep it in good running condition.

A question was asked as to the life of the dumping mechanism of the trucks. Mr. Schmidt said that this mechanism was very simple and that the life was apt to be quite as long as the life of any part of the truck.

Mr. Schmidt said that in the case of which he had spoken the truck system had been put in service in a newly opened quarry and it had been proven efficient and very advantageous from the standpoint of mobility, so they had kept on with it. But he did not think that it would be advisable to tear our trucks which were already installed and to put in trucks.

As to the life of tires, his experience had been that tires would not last two years, but that they would stand up well for a season.

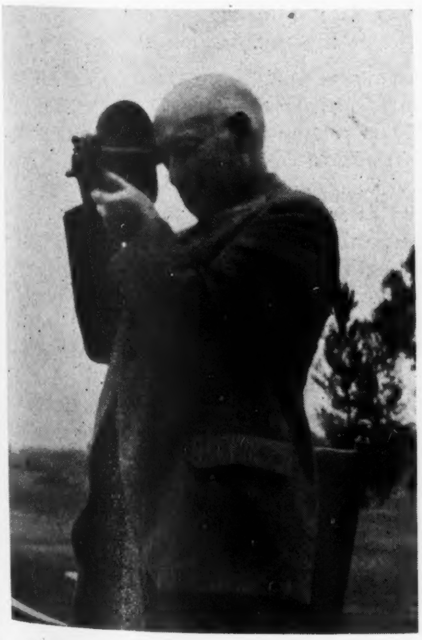
Seismologist's Work Reduces Claims for Blasting Damage at Bound Brook

Later Mr. Schmidt was asked to give the experiences of his company with those who had complained of the effect of blasting in the Bound Brook quarry. This quarry, he said, is in trap rock and has a 160-ft. face. Seven or eight holes were fired at one shot, which brought down a lot of rock in a well fragmented condition, but which also brought in the neighbors and eventually the lawyers. As a means of forestalling litigation and of being fair to everyone an arbitration board was appointed to appraise the damage caused by the blast. Meanwhile a seismologist was called in and he investigated the

New York State Crushed Stone Association at the Yahnundasis Club, Utica, N. Y.

effect of blasting. The arrangement of graduated pins used in the Winchester quarry of the General Crushed Stone Co. (described in Rock Products of Aug. 22, 1925), was also procured and used. The seismologist found that there was very little vibration. A heavy man walking across the floor affected the instruments about as strongly as a blast would affect them. The seismologist found that the actual movement had about 0.0073 in. amplitude. There were 12 vibrations per second and the acceleration was 42.6 in. per second per second.

The houses, which it was claimed were affected, were about one and a third miles distant and it was claimed that some 25 were affected. The result of doing this seismographic work was to make people more reasonable. The arbitrators had decided that about $700 damage had been done, although the original claims were for more than $7,000. However, in order to avoid complaint the company had thought it better to cut down the size of the blast.



James Savage using his new motion picture camera

The seal shown above without the map will hereafter be used by all members.

Harry R. Beebe, a newly elected member (from Peerless Quarries, Inc.), was welcomed and made brief remarks.

President Seitz announced that F. W. Schmidt, Sr., was in the hospital recovering from an operation. On the motion of Mr. Graves it was voted to send him flowers and a telegram expressing the regret of the members for his absence and their wishes for his speedy recovery.

The remainder of the afternoon was spent at the very interesting quarry of the Peerless Quarries, Inc., some 17 miles out of Utica. Harold and A. H. Owens and H. R. Beebe, some of the owners of this property, took charge of parties and showed them through the works. The layout is so different from the usual quarry and plant and there are so many unusual features (such as the method of washing the stone before loading) that all were keenly interested.

Those who were present were:

John Rice, Otho M. Graves, George Schaefer (secretary of the association), and Grover J. Murphy, from the General Crushed Stone Co.

A. G. Seitz (president of the association) and W. L. Sporborg, of the Rock Cut Stone Co., Syracuse.

F. E. Conley and Grant A. Hunter of the F. E. Conley Co., Utica.

Harold Owens, A. H. Owens, John Wagoner and Harry R. Beebe of Peerless Quarries, Inc., Utica.

James Savage, A. L. Hooker and F. W. Schmidt, Jr., of the Buffalo Crushed Stone Co., Buffalo.

William McGrew and Harry Lancaster of the L. and M. Stone Co., Prospect.

B. R. Babcock of the Callinan Co., Albany.

Frank Howe of the LeRoy Lime and Stone Co., LeRoy.

Daniel O. Hastings of the Interstate Amiesite Co.

William Anderson of the Hercules Powder Co.

Edmund Shaw, Rock Products.

On the invitation of the proprietors of the Rock Cut Quarry Co., the August meeting will be held at Syracuse.

Canadian Gypsum Production for 1925

ACCORDING to finally revised statistics, just issued by the mining branch of the Dominion Bureau of Statistics at Ottawa, Canada, gypsum production in Canada during 1925 totalled 740,323 tons, a new high record for this important Canadian mining industry. The value received by the operators was $2,389,891, or $3.23 per ton. In 1924, the shipments amounted to 646,016 tons, valued at $2,808,108. Gypsum rock quarried in 1925 totalled 705,852 tons, of which quantity 162,820 tons, or 23%, was calcined.

Importations of gypsum into Canada were recorded at 8,921 tons, with a valuation of $136,308, while exports of Canadian gypsum amounted to 539,289 tons consisting of 533,646 tons crude and 5,643 tons ground, having a total value of $948,710.

Capital employed in the gypsum industry in 1925 was reported at $4,506,995. Employment was furnished 51 salaried employees, 726 mine workers and 262 mill workers and their combined earnings were $1,108,585. The cost of fuel used during the year was $131,790 while the electric power consumed meant a further outlay of $57,859. Plant equipment included 78 electric motors, with a combined rating of 2,892 hp.

To Develop Foreign Markets for Gypsum Products

WITH the establishment of a good trade in gypsum plaster and plaster board between British Columbia and New Zealand, it is now planned to extend this to China, Japan and South Africa markets, according to William Martin, president of the British Columbia Gypsum Co., New Westminster, B. C., and the Manitoba Gypsum Co., Winnipeg, Man. The British Columbia company recently made its record shipment of gypsum products to New Zealand and expects to follow this with other shipments at later dates.—*New Westminster (B. C.) Columbian.*

Current Abstracts of Foreign Literature

Production of Super Cements in Shaft Kilns. Correct burning in the automatic shaft kiln is essential for the production of a super cement. It is very difficult for the untrained operator to tell when the firing is not satisfactory. Various rules have been developed which may be summarized as follows: 1. The firing must be accomplished in a ring of flame which must be seen at all the doors and which must appear as a bright red incandescence below. 2. The flame must never break in the middle of the kiln. 3. The density of the smoke yields certain information regarding the intensity of the firing. 4. The clinker must leave the kiln at least hot enough to be warm to the hand.

In the original article these four points are elaborated, and there are also discussed a number of improvements which have been made in the grinders used for making a very finely pulverized cement. An example as to how the quality of the cement was materially improved by a simple process is given. Thus a shaft kiln yielded a cement from good grade of raw materials with 320 to 350 kg. per sq. cm. resistance to crushing after 28 days hardening in a 1:3 mortar. The raw material was ground and left 20 to 25% residue on a 4900 mesh screen. Tests showed that the increase in strength of the cement stopped when the degree of fineness was such that 4% residue was obtained on a 4900 mesh screen. The sintering process was accelerated as the fineness increased until the same maximum point was reached.

Strength tests were made on mixtures of cement from a raw material containing 20 to 25% residue on a 4900 mesh screen, and 2% gypsum, as well as 3, 4 and 5% gypsum. The cement with the greater strength contained the most gypsum and all cements increased in strength from the second to the 28th day. Thus a cement containing 5% gypsum had a strength of 252 kg. per sq. cm. against 196 for one with 3% gypsum after two days. At the end of the 28th day the strength had increased to 532 kg. per sq. cm. for the 5% gypsum cement and to 423 for the 3% cement.

Other experiments carried out in different mills have substantiated the conclusion that the best results are obtained when a maximum of 4% gypsum is used as the crystallized salt.

Tests were also made in a mill operating four rotary kilns and using a raw material consisting of a limestone marl and cement rock. The two ingredients were used in the proportion of 1:3 and were then ground to such a fineness that about 20 to 25% remained behind on a 4900 mesh screen. The crude unburnt cement had the following composition: SiO_2, 14.00%; Al_2O_3, 4.30%; Fe_2O_3, 2.16%; CaO, 42.00%; MgO, 0.32%; SO_3, 0.25%, and loss on ignition, 36.40%. The clinker was made with a consumption of 13 to 15% of anthracite coal dust, and the composition of the clinker was as follows: SiO_2, 21.85%; Al_2O_3, 6.50%; Fe_2O_3, 3.25%; CaO, 65.80%; MgO, 0.45%; SO_3, 0.06%; insoluble matter, 0.25%, and loss on ignition, 0.40%.

Strength tests were also made with this cement with the addition of 4% of gypsum and the effect of time of standing on the strength was also determined. A mixture of the cement with common sand in the ratio of 1:3 gave a resistance to crushing at the end of three days of 350 to 400 kg. per sq. cm. when the fineness of the cement was such that 10 to 12% remained behind on a 4900 mesh screen. On stronger burning of the clinker the strength rose to 500 kg. per sq. cm. at the end of three days. This rather remarkable strength is to be assigned only to the use of anthracite coal which had an ash content of only 10 to 13%.

Other tests were made in a cement mill equipped both with rotary kilns and shaft kilns. The raw material was a hard limestone and oil shale, which was not suitable for the shaft kiln. Thus while the clinker was satisfactory in the rotary kiln, the results obtained with the shaft kiln were entirely unsatisfactory. Then it was determined to use anthracite coal as fuel and under these conditions using half the amount of anthracite required in the rotary kiln an entirely satisfactory clinker was obtained from the shaft kiln.

The general conclusion that was drawn from these tests was that it was possible to make a high grade or super-cement in the automatic shaft kiln at least just as effectively, and also considerably cheaper, than in the rotary kiln. *Zement*, **15** (1926), 418-421.

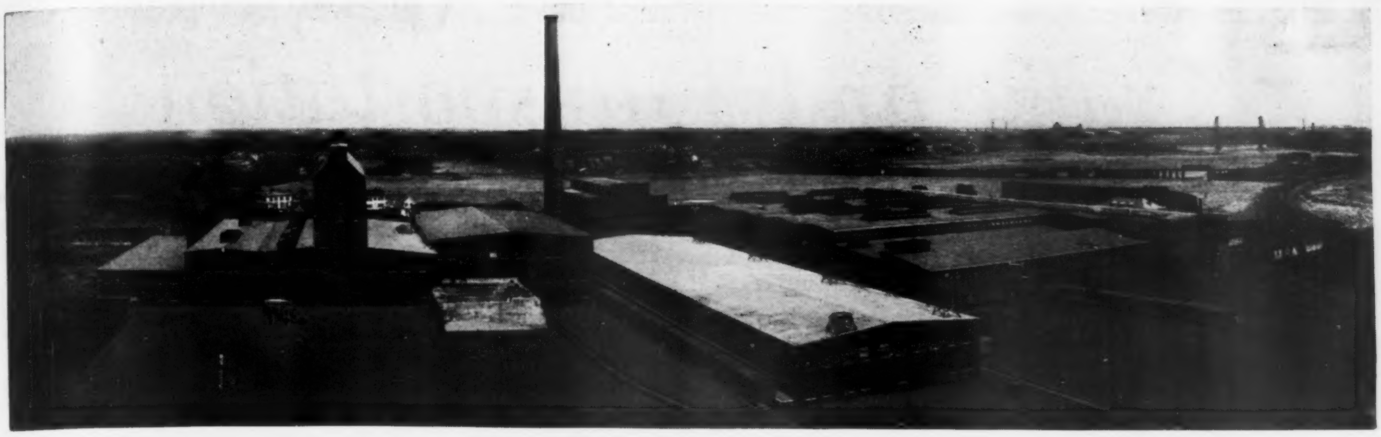
Setting Accelerator for Hydraulic Binding Agents. The process of making this accelerator consists first in preparing a neutral hydrochloric acid solution of the binding agent itself, which is done by dissolving the latter in concentrated hydrochloric acid until a neutral reaction is obtained. Then this solution is evaporated to a stiff paste and thereafter it is mixed with oxides, silicates and the like of lime, dolomite, etc. The mixture is then rubbed together until it sets. An alternative process, which is better and safer, consists in adding to the unchanged neutral solution, referred to above, a dry mixture of lime and calcium chloride, for example, while it is being constantly stirred until the mixture, which is almost dry at the beginning, is quite fluid. This mash will solidify when heated just slightly after a certain number of hours to form a stable, basic salt of considerable activity as an accelerator in setting of cement. *German Patent Application* 72,830.

Relation of Fineness of Cement to Strength. There are two ways in which the quality of a cement may be improved. In the first place the lime content may be increased, and next the degree of fineness of the ground cement may be increased. In the first case there are of course certain limits beyond which it is not wise to go. Thus it is found that as the lime content of the cement is increased, the resistance to compression and tension will increase to a certain limit and then as the lime percentage is further increased, the tensile strength of the cement decreases while its compression strength continues to increase.

The second method of improving the quality of cement, by increasing the fineness of grinding. Certain investigations on this matter have indicated that the strength of cement will increase with the increasing fineness of grinding almost in a straight line relation, up to a maximum effect which is observed at the end of three days, the strength decreasing as the time of hardening increases further. The increase in the tensile strength of the cement is not in the same proportion as that of the compression strength.

Tests were made on cements which were so fine that from 6% to 15% remained behind on a 4900 mesh screen. It was found that after 3 days the strength of the cement had increased 67.5%, after 7 days 30.0% and after 28 days 22.5%. The increase in fineness of the cement induces high initial strengths and hence is a potent factor. Very fine grinding is used in making super-cements. *Zement*, 1926 (439-41).

Rotary Drum Cooler.—A rotary drum cooler in which materials are treated with air currents, such as a cooler connected to a rotary cement kiln, is provided with metallic cylinder rings, bands, plates or the like, having a large surface relative to their weight. These are connected to the inner surface of the drum by chains permitting a limited amount of free movement and arranged within the drum to attain the maximum amount of transference of heat from air to the material or vice versa.—*British Patent No.* 250,318.



Ship-building plant at Freeman's Point, N. H., which will be equipped for the manufacture of gypsum products by the Atlantic Gypsum Products Corp. [Photo by courtesy of Portsmouth (N. H.) Herald]

New Gypsum Products Plant to Operate in New England

Recently Formed Atlantic Gypsum Products Corporation to Convert Old Ship-Building Plant at Portsmouth, N. H.

AS announced recently in ROCK PRODUCTS, the consolidation of the Rock Plaster Corp., New York, into the newly formed Atlantic Gypsum Products Corp., has been completed. The new company has acquired the large buildings used by the Atlantic corporation for building ships, located at Freeman's Point, near Portsmouth, N. H. The property consists of about 65 acres of land on tidewater with ample docking facilities and buildings having about 500,000 ft. of floor space. With the changes to be made at these buildings it is said that the plant will be the largest single operation manufacturing both gypsum and fibre products in the United States.

H. C. Raynes, vice-president and general manager

It is planned to make the East river plant of the Rock Plaster Corp. the terminal of water shipments from Portsmouth into the markets of that section and there will be a regular schedule of sea traffic between the two ports. The quarry at Walton, Nova Scotia, will be enlarged to meet the demands of both the Portsmouth and New York plants and regular schedules between Nova Scotia and Portsmouth and New York by steamers will be maintained.

In addition to the usual gypsum products sent as wallboard, block, etc., the Portsmouth plant will make fibre wallboard and fibre sheathing or synthetic lumber under a new process and insulation fibre materials. It is also planned to utilize the large machine shop at the plant for the manufacture of machinery for different purposes.

According to reports, the plant will employ from 400 to 600 men and will operate on a 24-hour day, three-shift basis, for six days a week. Work will commence as soon as the necessary alterations have been made.

The financial details have already been taken care of through the firm of Lee, Higginson and Co. and were published in full in ROCK PRODUCTS, July 10 issue. The officers of the company are: Albert F. Bemis, chairman of the board and who is also president of Bemis Industries, Inc.; G. N. Roberts, president; Harry C. Raynes, first vice-president and general manager; J. Clifford Woodhull, second vice-president, and W. P. Fuller, treasurer.

The directors of the company will be the above officers and the following: Henry M. Channing of Channing-Corneau and Frothingham, Boston lawyers; Gov. J. Winant of New Hampshire, L. R. Fuller of New York and representatives of Lee, Higginson Co.

Standard Gypsum Makes First Foreign Shipment

THE first foreign shipment of gypsum plaster from the Long Beach, Calif., plant of the Standard Gypsum Co., was made recently when about 200 tons of the material was loaded on the Japanese ship Iwatasan at San Pedro. The consignment to Osaka, Japan, is only a preliminary shipment, according to W. B. Lenhart, superintendent of the Long Beach plant, and will be followed before long by larger amounts.—*Long Beach (Calif.) Sun.*

U. S. Gypsum to Market New Acoustical Plaster

ANNOUNCEMENT is made at the Chicago office of the United States Gypsum Company that Sabinate acoustical plaster, developed at Riverbank Laboratories, Geneva, Ill., by Dr. Paul E. Sabine, is to be manufactured and marketed by the company under an exclusive license.

This material comes to the job already sanded and requires only the addition of water. It is porous in composition and instead of reflecting virtually all the sound that strikes it, it is said to absorb a great proportion of the sound which it transforms by friction to heat-energy. It has good covering capacity and its application involves no greater problem than the application of ordinary plaster.

While this material was perfected over five years ago, it has been withheld from the market by Riverbank Laboratories until actual job experience should substantiate or disprove the results obtained in laboratory tests. To obtain this job experience two rooms at Riverbank Laboratories, one room of the Geneva (Ill.) high school, and auditorium and radio broadcast rooms at various points in the United States were plastered with it. According to Dr. Sabine these test jobs all are in perfect condition and the material has performed identically on the job as it did in the laboratory.

Tests and researches into the physics of sound, according to Dr. Sabine, have demonstrated that through the use of this material a maximum of acoustical efficiency can be obtained in any theater, church, auditorium, school or other room. Riverbank Laboratories, where Sabinite was developed, is a scientific organization that was founded and is maintained by Col. George Fabyan. The researches into the physics of sound conducted there by Dr. Sabine are a continuation of the work begun by his late cousin, Prof. Wallace C. Sabine of Harvard University, Cambridge, Mass.

Traffic and Transportation

EDWIN BROOKER, Consulting Transportation and Traffic Expert
Munsey Building, Washington, D. C.

SOUTHWESTERN FREIGHT BUREAU DOCKET

9202. **Lime**, from Mercer, Ark., to points in Oklahoma. To establish the following rates in cents per 100 lb. on lime, carloads, minimum weight 30,000 lb., from Mercer, Ark., to points shown below:

Station—	Rate	Station—	Rate
Racine, Mo.	13½	Price	26½
Seneca, Mo.	13½	Fisher	26½
Oklahoma points:		Keystone	26½
Wyandotte	15½	Mannford	26½
Morey	17	Tank City	26½
Ogeechee	17	Terlton	26½
Fairland	17	North Jennings	27½
Fullbright	17	Hallett	27½
Afton	17½	Greenup	27½
Todd	17½	Casey	27½
Asylum	17½	Pawnee	27½
Vinita	17½	Lela	27½
Refinery Spur	19	Morrison	27½
Nemo	19	Sumner	27½
White Oak	19	Drace	27½
Duncan	19	Perry	27½
Catale	19	Gansel	30
Chelsea	20½	Lucien	30
Bushyhead	20½	Hayward	30
Foyil	20½	Covington	30
Sequoyah	20½	Fairmont	30
Claremore	22	Shea	30
Verdigris	22	Enid	30
Catoosa	22½	Carrier	30
Tiger	22½	Goltry	30
Garnett	22½	Helena	30
Dawson	22½	McWillie	30
Tulsa	22½	Carmen	30
Red Fork	22½	Dacoma	30
Red Fks. Stk. Yds.	22½	Hopeton	30
Taneha	22½	Avard	30
Bowden	22½	Jennings	27½
Gas	22½	Sapulpa Glass Co.	22½
Sapulpa	22½	Nola	22½
Lewis	26½	Keifer	22½
Kelleyville	26½	Cantrell	22½
Gaston	26½	Mounds	22½
Bristow	26½	Lemon	22½
Depew	26½	Greene	22½
Stroud	26½	Beggs	22½
Davenport	27½	Laden	25½
Chandler	27½	Preston	25½
Warwick	27½	Okmulgee	25½
Wellston	27½	Brundidge	25½
Luther	27½	Schulter	25½
Ludlow	27½	Pioneer	26½
Jones	27½	Henryetta	26½
Spencer	27½	Creek Mine Spur	26½
Wadsock	27½	Victoria Mine	26½
South Yard	27½	Bryant	26½
Okla. Stk. Yds.	27½	Weleetka	26½
Okla. City	27½	Wetumka	26½
McMann	26½	Yeager	26½
Shamrock	26½	Holdenville	26½
Wheatland	27½	Spaulding	27½
Mustang	30	Sasakwa	27½
Selena	30	Francis	27½
Tuttle	30	Oakman	27½
Sooner	30	Fords	27½
Amber	30	Ada	27½
Chickasha	30	Parkell	27½
Norge	34	Lawrence	27½
Laverty	34	Lantry	27½
Cement	34	Fitzhugh	27½
Gladys	34	Roff	27½
Cyril	34	Glassand	27½
Fletcher	34	Hickory (Murry Co.)	27½
Ft. Sill	34	Scullin	27½
Lawton	34	Mill Creek	27½
Cache	35	Troy	27½
Indiahoma	35	Ravia	27½
Snyder	35	Randolph	29
Headrick	35	Madill	29
Altus	35	Kingston	29
Roark	35	Woodville	29
Olustee	35	Platter	34
Creta	35	Pickwick	34
El Dorado	35	Sulphur	27½
Kengle	26½		
Gray	26½		

The proposed rates are on the same basis as now applicable from Ruddels and Limedale Spur, Ark., on the Mo. Pac., and from Mercer, Ark., to points in Oklahoma on the A. T. & S. F. and M.-K.-T. Rys. The M. & N. A. feel that they should be allowed to participate in the traffic to Frisco, Oklahoma points on the same basis as other Arkansas lines.

9237. **Lime** from Johnsons, Ark., to Dallas, Tex. To establish a rate of 22½c per 100 lb. on lime, carloads, minimum weight 30,000 lb., from Johnsons, Ark., to Dallas, Tex. Shippers in Arkansas complain that they are unable to compete with kilns at McNeil and Dittlinger, Tex., which enjoy rates of 18c and 19c, respectively, to Dallas for distance of 186 miles and 252 miles. Distance from Johnsons to Dallas is 374 miles and rate of 22½c is fair basis, distance considered.

9259. **Limestone**, from points in Missouri to Bartlesville, Okla. To establish a rate of 9c per 100 lb. on ground limestone, carloads, minimum weight 90% of the marked capacity of car, except where car is loaded to full visible capacity, actual weight will apply, but in no case shall the minimum weight be less than 40,000 lb., from Alba, Aurora, Carthage, Granby, Joplin, Neck City, Orongo, Purcell and Webb City-Carterville, Mo., to Bartlesville, Okla. Farmers in the vicinity of Bartlesville, Okla., are desirous of securing ground limestone from the Joplin district, but find the present class rates prohibitive and have requested that more reasonable rates be established.

9117. **Silica**, from High Point, Ark., to points in Texas, Louisiana and Oklahoma. To establish the following rates in cents per 100 lb. on silica, carloads, minimum weight 50,000 lb., from High Point, Ark., to Dallas and Ft. Worth, Texas, rate of 28½c; Houston, Texas, 32c; San Antonio, Texas 35c; Shreveport, La., 20½c; Oklahoma City, Okla., 30c.

There is a development of this commodity at High Point and it is necessary that reasonable rates be established to enable the traffic to move. The rates proposed are on the basis of the Texas scale extended in the same manner as was done in the case of rates from Rogers, Ark.

9185. **Gravel**, from points in Texas to points in Louisiana. To establish the following scale of rates in cents per 100 lb. on gravel, rock, crushed or ground, and sand in straight or mixed carloads. Minimum weight marked capacity of car, except when cars are loaded to actual visible loading capacity, actual weight will govern, but not less than 50,000 lb., from Texas points on the G. C. & S. F. located in commodity Group P shown in S. W. L. Tariff 21-R, to Louisiana stations on the G. C. & S. F. Ry.

5 miles and under	3½
25 miles and over 5 miles	3½
50 miles and over 25 miles	4
75 miles and over 50 miles	4½
100 miles and over 75 miles	5
130 miles and over 100 miles	6
150 miles and over 130 miles	6½
175 miles and over 150 miles	7
225 miles and over 175 miles	7½
250 miles and over 225 miles	8
275 miles and over 250 miles	8½
300 miles and over 275 miles	9

There is a movement from points in the Beaumont district to Elizabeth, La., and it is felt higher rates than are applicable in the reverse direction cannot be justified.

9200. **Stone**, from points in Indiana to El Dorado, Ark. To establish a rate of 30c per 100 lb. on stone, except ground, pulverized or crushed stone in packages; granite and marble not lettered, figured or polished; in straight or mixed carloads, minimum weight 20,000 lb., from Bedford, Ind., and other Indiana points shown in Item 7780 of S. W. L. Tariff No. 45-Q to El Dorado, Ark. Shippers request the publication of a rate to El Dorado, Ark., that will be on an equitable basis when compared with the rate to Little Rock, Ark.

8965. **Lime**, from Lime Rock, Colo., to Amarillo, Tex. To establish rate of 32c per 100 lb. on lime, carloads, minimum weight 30,000 lb., from Lime Rock, Colo., to Amarillo, Tex. Proposed change contemplates establishing rate from Lime Rock, Colo., that will be somewhat in line with rate from Ash Grove, Mo., to Amarillo.

WESTERN TRUNK LINE DOCKET

5573. **Rock, gypsum**, carloads, from Blue Rapids and Irving, Kan., to Continental, Mo. Present rate, 16c per 100 lb.; proposed, 14½c per 100 lb. Minimum weight 90% of the marked capacity of car, but not less than 60,000 lb.

1266-B. **Stone, crushed or ground**, carloads, from Colorado Springs, Colo., to Colby, Kan. Present rate, 20c per 100 lb., subject to minimum weight 40,000 lb., this being the distance Class E rate for a distance of 222 miles from Colorado Springs to Colby, Kan.; proposed, 8½c per 100 lb., subject to minimum weight of 90% of marked capacity of car, except that when weight of shipment loaded to full visible capacity of car is less than 90% of car, the actual weight will apply. Minimum weight further to be not less than 40,000 lb. (By shipper.)

5502-A. **Stone**, crushed, carloads, from Gallatin, Mo., to Kansas and Nebraska points. Present, class or combination rates; proposed, Nebraska scale. (By shipper.)

2051-V. **Stone**, crushed, carloads, from Jasper, Pipestone and Quartzite, Minn., and Sioux Falls, S. D., to Winterset, Iowa. Present, Class E; proposed, 10c per 100 lb. Minimum weight 90% of marked capacity of car, except that when weight of shipment loaded to full visible capacity of car is less than 90% of the marked capacity, the actual weight will apply; but in no case shall the minimum weight be less than 40,000 lb.

4686A. **Agricultural limestone**, carloads, from Carthage, Blackwater and Pixleys, Mo., to points in Kansas on connecting lines. Present rate, combination of locals; proposed, to established mileage rates based on the higher joint line distance scale now applicable on Missouri and Kansas intrastate traffic. For example (rates in cents per ton of 2000 lb.):

	Via Two Lines	Via Three Lines
40 miles and under	70	80
50 miles and over 40	80	90
100 miles and over 90	110	110
200 miles and over 190	155	155
250 miles and over 240	175	175

SOUTHERN FREIGHT ASSOCIATION DOCKET

28187. **Crushed stone**, from Mt. Vernon and Spark's Quarry, Ky., to Saxton and Jellico. In lieu of rate of 120c per net ton, it is proposed to establish rate of 95c per net ton on stone, crushed, carloads, minimum weight 90% of the marked capacity of the car, except when cars are loaded to their visible capacity, actual weight shall govern, from Mt. Vernon and Spark's Quarry, Ky., to Saxton, Ky., and Jellico, Tenn. Proposed in order to permit quarries at origins named to meet competition of small quarries near Saxton and Jellico.

28203. **Sand and gravel**, from Columbus, New Hope and Rucker, Miss., to A. T. & N. R. R. stations. Rates on gravel and sand, carloads, from the origins named to A. T. & N. R. R. stations as far south as York are, when consigned to the Alabama State Highway Department, 103c per net ton; when consigned to county or municipal authorities: 90c per ton to Shepard, Owens, Carloss and Carrollton, Ala.; 113c per ton to stations Bell Bailey to York, Ala., inclusive. It is proposed to revise these rates to be on the same basis, regardless of whether consigned to county or municipal authorities or to the state highway department, the proposed rates to be: To Shepard, Owens and Carloss and Carrollton, Ala., 90c per net ton; to stations Bell Bailey, Ala., to York, Ala., inclusive, 103c per net ton.

28211. **Crushed stone**, from Whitestone and Tate, Ga., to Momence, Kankakee and Champaign, Ill. In lieu of combination rates, it is proposed to establish through rate of 423c per net ton on marble, crushed, in bags, carloads, minimum weight capacity of car, from Tate, Ga., and on stone, crushed, carloads, minimum weight 60,000 lb., from Whitestone, Ga., to Momence, Kankakee and Champaign, Ill., same as rate in effect to Chicago, Ill.

28235. **Marble**, crushed, marble, dust and marble spalls, from Moretti, Ala., and Meadow, Tenn., to C. F. A. territory; cancellation. It is proposed to cancel the present commodity rates on marble, crushed, carloads, and marble, dust, carloads, from Moretti, Ala., and on marble spalls, carloads, from Meadow, Tenn., to destinations in C. F. A. territory, as published in Agt. Glenn's I. C. C. A554 and L. & N. R. R. I. C. C. A15717, to which there is no movement. Combination rates to apply after cancellation.

28241. **Sand and gravel**, crushed stone and slag, minimum carload weight on, from N. C. & St. L. producing points. Generally speaking, commodity rates on sand, gravel, crushed stone and slag, from producing points on the N. C. & St. L. Ry., are subject to the following minimum rule: "Carload minimum weight to be stencilled capacity of car, subject to the following exceptions: In the absence of weighing facilities at shipping point if

the shipment is weighed in transit or at destination, carload minimum weight will be 90% of stencilled capacity of car. When cars are loaded to their visible capacity, actual weight will govern." In practically all cases, the sand and gravel pits and stone quarries served by the N. C. & St. L. Ry. are some distance from the first scaling point, and, as consequence, the minimum weight actually employed is generally 90% of stencilled capacity of car. For the sake of uniformity and to avoid confusion, it is proposed to revise this rule to read: "Carload minimum weight will be 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight will govern."

28276. **Sand**, from White Oak, Tenn., to Brownsville, Tenn. In lieu of combination basis, it is proposed to establish rate of 125c per net ton on sand, carloads, minimum weight 90% marked capacity of car, except when cars are loaded to their visible capacity and actual weight shall govern, from White Oak to Brownsville, Tenn.

28287. **Sand and gravel**, from Montgomery, Jackson's Lake, Prattville Junction, Oktamulke and Coosade, Ala., to L. & N. R. R., P. & A. division stations. The following revision is proposed in rates on sand and gravel, straight or mixed car loads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight shall govern:

To Marianna, Fla.

(In cents per net ton)

From—	Pres.	Prop.
Montgomery, Ala.	189	167
Jackson's Lake	207	171
Prattville Junction, Ala.	207	171
Oktamulke, Ala.	207	171
Coosada, Ala.	207	171

The rate from Montgomery to Marianna to be held as maximum at intermediate points. The proposed rates are made not less than the Georgia-Alabama scale of trunk lines, other than the L. & N. R. R. less 10%.

28288. **Agricultural stone**, from Hopkinsville, Ky., to L. & N. R. R., O. & N. Division and Henderson Division stations. It is proposed to revise the present rates on stone, agricultural (ground limestone), carloads, minimum weight 60,000 lb., when loaded in box cars the equipment must be lined with strong paper to prevent loss—from Hopkinsville, Ky., to stations on the L. & N. R. R., O. & N. Division and Henderson Division within a radius of 80 miles of Hopkinsville, to be more nearly in line with rates of the I. C. R. R. to points in the same general territory. Statement of present and proposed rates will be furnished upon request.

28297. **Limestone**, from Ladds, Ga., to Lyman, Miss. In lieu of combination rate, it is proposed to establish rate of 261c per net ton on limestone, ground or pulverized, carloads, minimum weight marked capacity of car, except when cars are loaded to full visible capacity, actual weight will apply from Ladds, Ga., to Lyman, Miss., same as present rate to Gulfport, Miss.

27754. **Ground or pulverized limestone** or marble from Sparta, Tenn., and Cartersville, Ga., to all stations on the A. B. & A. Ry. and A. & W. P.-W. Ry. of Ala. It is proposed to establish through rates on ground or pulverized limestone or marble, carload minimum weight marked capacity of car, except when car is loaded to full visible capacity, actual weight will apply, from Sparta, Tenn., and Cartersville, Ga., to all points on the A. B. & A. Ry., and A. & W. P.-W. Ry. of Ala., made on basis of the Georgia proposed scale in lieu of present combination rates.

28314. **Sand and gravel** from Montgomery, Ala., to White Springs, Fla.—Cancellation. It is proposed to cancel commodity rate of 189c per net ton on sand and gravel, carloads, from Montgomery, Ala., to White Springs, Fla., account of no movement. Combination to apply after cancellation.

28316. **Sand** from Sawyers Mill and Lipe, Tenn., to Southeastern points named below. In lieu of combination rates it is proposed to establish the following through rates on sand, in packages or in bulk, carloads, minimum weight will be stenciled capacity of car, except where cars are loaded to visible capacity and/or in the absence of weighing facilities at shipping point, if freight is weighed in transit or at destination, carload minimum weight will be 90% of the stenciled capacity of car, from Sawyers Mill and Lipe, Tenn., to Avondale, Ala., 180c; Holt and Tuscaloosa, Ala., 185c; Macon, Ga., 216c, and Cleveland, Tenn., 176c per net ton. Proposed rates to Holt, Tuscaloosa and Cleveland are made on basis of the scale proposed by carriers to the Georgia Railroad Commission; to Macon, Ga., on basis of the proposed Georgia scale, extended for the Macon distance, and to Avondale, Ala., same as rate in effect to other Birmingham group points.

28346. **Stone**, broken or crushed, from Yellow Rock, Ky., to L. & N. R. R. eastern Kentucky division stations. It is proposed to establish reduced rate of 122c per net ton on stone, broken or crushed, carload minimum 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight shall govern, from Yellow Rock, Ky., to Seco, Ky., and observe this figure at intermediate destinations to which present rates are in excess of this figure. The proposed rate is for the purpose of enabling shippers at Yellow Rock, Ky., to meet competition of quarries located near the destinations involved.

28355. **Crushed stone** from Shelton, N. C., to Roxboro and Woodsdale, N. C. In lieu of combination basis, it is proposed to establish rate of 120c per net ton on stone, crushed, carload minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight will govern, from Shelton, N. C., to Roxboro and Woodsdale, N. C.

28409. **Crushed stone** from Newsom and Mimms, Tenn., to Cades and Kerrville, Tenn. It is proposed to establish the following reduced rates on stone, crushed, carloads, minimum weight stenciled capacity of car, except that in the absence of weighing facilities at shipping point, if freight is weighed in transit at destination, carload minimum weight will be 90% of stenciled capacity of car, and except, further, when cars are loaded to their visible capacity, in which case actual weight will govern: From Newsom, Tenn., to Cades, 137c; to Kerrville, 145c per net ton, made with relation to rates from Cedar Bluff, Cerulean, Ky., and Anna, Ill. From Mimms, Tenn., to Cades, Tenn., 143c; to Kerrville, Tenn., 151c per net ton, made 6c per ton higher than proposed from Newsom, Tenn.

CENTRAL FREIGHT ASSOCIATION DOCKET

13751. **Sand**, carloads, Millington, Oregon, Ottawa, Utica and Wedron, Ill., to points east of western termini of Eastern Trunk Lines, on basis of 484c per net ton to New York. Present rate, 693c per net ton to New York.

13753. **Crushed stone**, in bulk in open top cars, carloads, Piqua, Ohio, to Canton, Ohio, and to Alliance, Ohio. Present rate, 6th class basis; proposed, to Canton, Ohio, 120c, and to Alliance, Ohoi, 130c per net ton.

13755. **Crushed stone**, carloads, Findlay and Luckey, Ohio, to Detroit, Mich. Present rate, 132c from Findlay, Ohio, and 125c from Luckey, Ohio; proposed, 105c per net ton.

13762. **Crushed stone**, carloads, Bascom, Ohio, to Botzum, Ohio. Present rate, 90c per net ton; proposed, 80c per net ton.

13763. **Stone**, broken or crushed, granite, crushed, in gondola cars, carloads, Milwaukee, Wis. (via car ferry), to Port Huron and Mt. Clemens, Mich. Present rate, 6th class, 23c to Port Huron, Mich., and 23½c to Mt. Clemens, Mich. Proposed, 176c per net ton to apply only on shipments originating at points west of west bank of Lake Michigan from which no joint through rates are in effect.

13766. **Crushed stone**, carloads, East Liberty, Ohio, following rates, in cents per net ton:

To—	Proposed
Cincinnati, Ohio	100
Franklin, Ohio	100
Glendale, Ohio	110
Miamisburg, Ohio	100
Spring Valley, Ohio	100
Xenia, Ohio	100

13767. **Crushed stone**, carloads, East Liberty, Ohio, to Pleasant Ridge, Ohio. Present rate, 6th class; proposed, 110c per net ton.

13770. **Gravel and sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica), carloads, siding of the East Liverpool Sand Co., east of Leetonia, Ohio, to Akron, Ohio. Present rate, 100c per net ton; proposed, 90c per net ton.

13771. **Gravel and sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica), carloads, Kern, Ind., to Toledo, Decatur, Lodge, Springfield, Gibson City and Morrisonville, Ill. Present rates, 6th class. Proposed—From Kern, Ind., to Tolono, Ill., 85c; to Decatur, Ill., 95c; to Lodge, Ill., 98c; to Springfield, Gibson City and Morrisonville, 101c per net ton.

13775. **Dolomite**, roasted or burnt, carloads, Cold Springs and Durbin, Ohio, to Weirton, W. Va. Present rate, 260c per ton; proposed, 194c per ton.

13777. **Gravel and sand**, except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica, carloads, Mahoningtown, New Castle and Harbor Bridge, Pa., to Beaver Falls, Pa. Present rate, 80c per net ton; proposed, 70c per net ton.

13779. **Gravel and sand** (other than blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica), carloads, Lafayette, Ind., to Terre Haute Ind. Present, 6th class; proposed, 120c per net ton to apply via C. I. & L., Crawfordsville and P. R. R.

13791. **Crushed stone**, carloads, East Liberty, Ohio, to Clare, Ohio. Present rate, 6th class; proposed, 110c per net ton.

13792. **Gravel and sand**, except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding and silica, carloads, Winona Lake, Ind., to Woodburn, Ind. Present rates, 13½c; proposed, 90c per net ton.

13793. **Core sand**, carloads, Smith's Crossing, Michigan, to points in Michigan. Proposed rates in cents per net ton: To Almont, 139, Ann Arbor 139, Battle Creek 151, Bay City 76, Benton Harbor 189, Grand Haven 151, Grand Rapids 151, Greeville 151, Holland 151, Jackson 139, Kalamazoo 164, Owosso 126, Romeo 139, St. Johns 126, South Haven 189, Imlay City 126, Pontiac 139.

10574. **Sand**, core, minimum weight, 90% of marked capacity of car, from Davisville, R. I., to Bound Brook, Carteret, New Brunswick, Trenton, Newark, Jersey City, Elizabeth, N. J., and Philadelphia, Pa., 18½. Reason—To permit new movement of traffic and equalize rate conditions.

ILLINOIS FREIGHT ASSOCIATION DOCKET

3543C. **Sand, all kinds**, except blast, engine, foundry, glass, etc., also gravel, carloads, minimum weight capacity of car, from East St. Louis, Ill., to representative points:

	Rates per net ton	
	Present	Proposed
Coulterville, Ill.	$0.98	$0.81
Carbondale, Ill.	1.01	.98
Benton, Ill.	1.01	.95
Johnson City, Ill.	1.13	1.01

3768A. **Sand and gravel**, carloads, from Shawneetown, Ill., to points on the I. C. R. R. in Illinois. To representative points:

	Rates per net ton	
	Present	Proposed
Central City, Ill.	*	$1.13
Tamaroa, Ill.	*	1.26
Johnson City, Ill.	*	1.26
Gale, Ill.	*	1.39
Effingham, Ill.	*	1.15

*Class rates or lowest combination.

2124A. **Agricultural limestone** for acid soil treatment, carloads, from Stolle, Ill., to B. & O. R. R. stations in Illinois. To representative points:

	Rates per net ton	
	Present	Proposed
Trenton, Ill.	$1.00	$0.90
Bannister, Ill.	1.10	1.03
Greendale, Ill.	1.11	1.05
Beardstown, Ill.	1.62	1.50
Ashland, Ill.	1.62	1.45

3408D. **Sand and gravel**, carloads, from Forreston, Ill., to Pontiac, Ill. Rates per net ton: Present, $1.01; proposed, 90c.

TRUNK LINE ASSOCIATION DOCKET

13653. **Fluxing limestone**, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity, actual weight will apply, from Williamson, Pa., to Buffalo, N. Y., $1.91 per ton of 2240 lb. (subject to rule 77). Reason—Shippers desire rate published which will be in line with that of their competitors located at Bellefone and Pleasant Gap, Pa. File 40951.

13657. **Sand**, other than blast, engine, foundry, molding, glass, quartz, silex or silica, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Morrisville and Tullytown, Pa., to Hoopeston, Pa., 80c per 2000 lb. (subject to rule 11).

Reason—Proposed rate is in harmony with the rates in force for hauls of comparable distance between points in the same general territory. File 41546.

Revise Sandusky Sand Rates

IN a report on No. 17038, Booth & Flinn, Ltd., vs. Pennsylvania, mimeographed, the Commission, by division 3, has found the rate on sand from Sandusky, O., to Pittsburgh, Penn., not unreasonable as applied to past shipments, but unreasonable for the future. The report also covers a sub-number, City of Pittsburgh vs. Baltimore & Ohio and Pennsylvania. The rate in the past on shipments, in May, 1925, was $2.05 per ton. The Commission discussed a number of cases in which rates on sand in the general territory were involved and came to the conclusion that the rates on sand, other than blast, engine, foundry, glass molding or silica, for single-line hauls from Sandusky to Pittsburgh over the lines of the defendants would be unreasonable for the future to the extent it might exceed $1.60 per net ton. That rate is to be established not later than September 1.

Edward Donnelly

EDWARD DONNELLY, vice president and treasurer of the Ohio Gravel Ballast Co. of Cincinnati, Ohio, died at the Good Samaritan hospital in that city on July 24. He was 44 years of age. Death followed an operation. Funeral services were held from

Edward Donnelly

his residence at Loveland, July 27, and he was buried at Miamiville, Ohio.

Edward Donnelly was an officer in the company, which is not only reckoned among the largest and strongest in the United States, but which is one of the pioneer producers of the country. It was founded by his father, Daniel Donnelly, and he himself was connected with it for 15 years, working his way from plant foreman to the position he held for three years preceding his death. His brother, Harry Donnelly, is president of the company.

The death of Edward Donnelly is a distinct loss not only to his company but to the sand and gravel industry as a whole. For he was a man of large views who early saw that sand and gravel production was more than a localized industry and he gave freely of his services to the promotion of the use of sand and gravel and to the work of the Ohio state and the National Association.

His whole life was passed at Loveland, which is about 15 miles from Cincinnati. He was born in Loveland and there he attended school. Among his schoolmates was the girl who afterwards became the sorrowing wife who survives him. Of his own family three brothers and one sister remain.

He was one of those men who have a genius for making friends and he belonged to a number of social and business organizations. Among these were the Masons, the Cuvier Press Club and the Business Men's Club of Cincinnati. Relatives and friends from far and near came to his funeral and the whole community mourned.

Oregon Gravel Company Enters Recent Ross Island Merger

PURCHASE of the control of the Oregon Gravel Co., Salem, Ore., by the Ross Island Sand and Gravel Co., Portland, Ore., has been completed according to a report in the Portland, Ore., *Journal*. The price is said to be about $100,000.

The Oregon company is one of the largest producers and distributors of sand and gravel in the Middle Willamette Valley territory. The company owns its sand and gravel deposits in the Willamette river and also operates a cement products plant at Salem, Ore.

According to D. L. Carpenter, president of the Ross Island company, the Oregon company will maintain its corporate identity and will be operated under the management of Ross Miles, present general manager. The sales and distribution will be handled by the parent organization and in this way cut the administration and overhead costs.

The Oregon Sand and Gravel Co. was owned and built into a successful concern by D. C. Miles, Ross Miles and A. A. Johnson of Salem, and J. H. Gallagher.

Properties now controlled by the Ross Island Sand and Gravel Co. include Ross island, Hardtack and Toe islands in the Willamette river near Portland; the 1100 bbl. cement mill at Gold Hill and large deposits of lime rock in southern Oregon owned by the Beaver Portland and the plant and sand and gravel deposits of the Oregon company.

Lime Company Has Heavy Fire Loss

THE Northern Lime and Stone Co., Petoskey, Mich., suffered a loss of approximately $20,000 recently through a fire, believed to have started from a railroad engine spark, which destroyed 3,000 cords of 4-ft. kiln wood on the company's grounds.

Loss was partially covered by insurance. A heavy rain aided firemen in keeping the flames from nearby buildings.—*Grand Rapids (Mich.) Press.*

Oka Company Launches New Sand Carrier

A NEW all-steel sand carrier, which makes the third that has been recently built for the Oka Sand and Gravel Co., Ltd., Montreal, Canada, was launched recently at the yards of Canadian Vickers, Ltd. The new carrier is 135 ft. long and 33 ft. 3 in. wide and 9 ft. 6 in. deep, with a retaining bulwark rising 6 ft. higher. It has a capacity of 550 cu. yd. or 900 tons of sand, and will be used to carry sand from the company pits at Oka to the dock in the Lachine canal.

Another carrier, making the fourth, is under construction, and is expected to be launched shortly. The one recently put into service was built within the remarkably short time of three weeks.—*Montreal (Canada) Gazette.*

Universal Gypsum Company Changes Name

AN announcement has gone out to dealers in gypsum products and others interested in the industry saying that the corporate name of the Universal Gypsum Co., Chicago, Ill., has been changed to the Universal Gypsum and Lime Co. This change is effective at once and is understood to be made in view of added manufacturing facilities which the company has acquired, details of which are not at present ready for publication.

Sand, Gravel and Stone Car Loadings Break Records

ACCORDING to figures compiled by the National Sand and Gravel Association all records of sand and gravel and stone car loadings were broken in the week ending July 3, when 71,460 cars were shipped. This is the fourth time that more than 70,000 cars were shipped in one week.

The shipments for the first six months of 1926 surpass all previous records for the first six months of any year, being 1,105,868 cars. The nearest record to this was made in the first six months of 1925 when 995,852 cars were loaded.

Fred Hall To Be Chairman of Cincinnati Convention

FRED E. HALL of the T. J. Hall Co., Cincinnati, Ohio, has been selected to serve as chairman in charge of the 1927 convention of the National Sand and Gravel Association to be held at Cincinnati, January 17, 18, 19. Convention headquarters will be maintained at the Hotel Gibson.

F. E. Hall

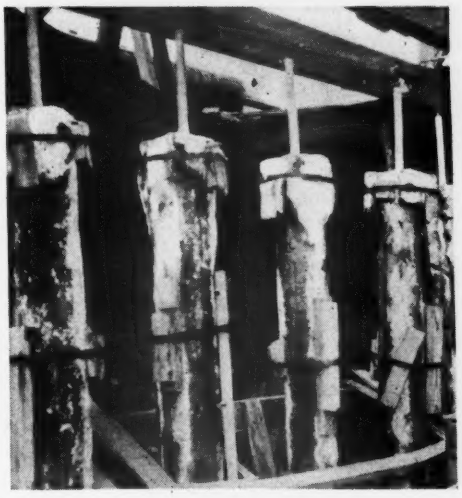
Cement Products
TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Builder Has Own Concrete Products Plant

Trim Stone and Ornamental Work Manufactured for Philadelphia Homes

A GREAT many houses are built in Philadelphia by the John H. McClatchy organization, so many that it has been found profitable for it to have its own central mixing plant for plaster and to make its own concrete trim stone. Formerly a concrete block plant was operated, but this has now been dismantled and blocks are bought from regular manufacturers.

The ornamental concrete work is in charge of J. P. Mollenkof, who is Mr. McClatchy's expert on plaster and stucco as well as concrete for trim and ornamental purposes. Mr. Mollenkof studied to be a sculptor and followed the trade of clay modeling for a number of years. Afterward he saw possibilities in concrete as an artistic material and opened a studio which he conducted until he joined Mr. McClatchy's force.



Plaster column molds which have been used many times

All the molds are made of plaster of paris from models of clay and plaster. With care they will last for about 150 pourings. One of the illustrations shows a set of column molds which have been used for a great many castings. It also shows the method of holding the halves of the mold together. Strap iron bands that fit very loosely are placed around it. These bear on pieces of wood, and wooden wedges are driven between the wood bearing pieces and the bands to tighten the joining of the molds.

The pieces are poured and not rammed of semi-dry concrete, which gives a nice surface and is easier on the molds. They are allowed to remain in the molds until sufficiently hard to be taken out and placed in the yard where they are air-cured.

In the case of columns an iron pipe of 1½ or 2-in. diameter is placed in the center

Shop for ornamental concrete work which a large builder of homes finds it profitable to conduct

of the mold before the concrete is poured. These serve as reinforcing and also to connect the column with the structure.

A great many cast door frames, coping lintels and sills have been cast here, but none were on hand when these pictures were taken. The ornamental forms, garden vases and the like go with the houses either as

Japanese garden lamp in concrete

parts of the building or as garden ornaments. Color has been used with good effect in many pieces, both as colored concrete and colored aggregate.

A very popular piece at one time was the Japanese garden lamp shown in one of the illustrations. This is a copyrighted design by Mr. Mollenkof. The colored workman who stood beside it to show the scale in the picture does all the work at this plant.

Northwestern Cement Products Men Meet

THE cement products manufacturers of the Northwest were welcomed to Pacific City, Wash., by W. H. Tucker of Aberdeen, Wash., when this group met for semi-annual convention on Gray's Harbor on July 30. About 40 were present from Oregon, Washington and Idaho.

W. F. Paddock, president of the association, presided at the opening session at 9:30 Friday morning July 30. Hans Mumm of Everett, Wash., responded to Mr. Tucker's address of welcome. Following this, reports of committees were presented and officers discussed activities of the preceding six months.

In the Friday afternoon session George Gauntlett, of Aberdeen, president of the northwest branch of Associated General Contractors, spoke on the subject, "The Irresponsible Contractor and the Local Improvement District Laws of Washington."

Russell Mack, also of Aberdeen, followed with an address on "Advertising." The Rev. T. H. Simpson, of Olympia, spoke to the assembly on "Why Some Business Men Are Unpopular."

J. R. Hewell, Spokane, gave a report on the meeting of the Concrete Pipe Association held in Chicago last February; H. M. Hadley, Seattle, and W. I. MacKenzie, Portland, gave excerpts from other cement products manufacturers' meetings held by their associations.

Other Friday afternoon speakers who discussed matters of interest to the industry were C. A. Schulman, Everett; G. W. Perrow, Spokane, and Lee Johnson, Tacoma.

On Saturday morning Prof. A. L. Miller of the University of Washington opened the session with a talk on "Effects of Hot Water Vapor on Settling of Portland Cement." Further reports of committees followed.

L. A. Perry of Longview spoke on "Water-Cement Ratio Control of Concrete Mixes." Minor Meriweather of Seattle discussed the topic, "Concrete Building Blocks and Building Tile."

The closing feature of the regular program was an address on "Concrete Products in Building Construction," by J. DeForrest Griffer of Chehalis. Following the adjournment the members made a trip to Lake Ceninault and to Indian reservation at Taholah.

Building Code Regulations On Concrete Masonry Units

IN an accompanying chart are reproduced a compilation of building code provisions regulating the use of concrete brick, tile and block in the leading local markets. These regulations may be interestingly compared with the American Concrete Institute specifications and the Hoover building code committee's recommendations, which are shown at the head of the compilation.

A study of this chart reveals gratifying progress in the struggle for consistent regulation, but also displays many interesting, if unexplainable inconsistencies which still exist in certain cities. The tabulation covers only 23 of the 150 or more codes containing provisions relating to concrete building units, but it covers practically the entire range of regulation.

The American Concrete Institute adopted its present standards for hollow concrete block and tile after a complete study had been made, extending over some eight years' been made, extending over eight years.

Of the cities whose code provisions are shown on the accompanying chart it is surprising that as yet only four have fixed the local requirement for block and tile at 700 lb. per sq. in. on the gross area, the compression strength arrived at by both Concrete Institute and Hoover code committees. Three cities require 750-lb. block and tile, one makes 800 lb. the legal reuqirement, one 900 lb. and six 1000 lb., while others compute capacity on the net section of the concrete ranging as high as the equivalent of 1200 to 1400 lb. on the gross area of the unit.

The requirements for concrete brick are contained in relatively few ordinances for the probable reason that this product is quite generally accepted as the practical equivalent of clay brick for which strength and other characteristics are only infrequently fixed by ordinance. The American Concrete Institute standard fixes the compression requirement at 1500 lb. per sq. in., as do the tentative standards of the American Society for Testing Materials. This figure is followed almost without exception where brick strengths are specified. Due to stronger bond developed with the mortar, 1500-lb. concrete brick regularly produce masonry equal in strength to that produced with clay brick testing from 2500 to 3500 lb. per sq. in.

Working stresses allowed on concrete block and tile walls vary all the way from 60 lb. to 200 lb. per sq. in., hardly any two requirements being alike. The Hoover code suggests a working stress of 80 lb. per sq. in. Seven of the cities listed have no height restriction. Others limit the height of concrete tile or block walls to heights varying from 3 to 6 stories and from 40 to 60 ft. Absorption requirements are fixed by the American Concrete Institute at 14 lb. of water per cu. ft. of concrete in the unit, which amounts to about 10% for sand or stone aggregate units. Five cities listed have no absorption requirement; three permit 15% absorption, one 12%, seven 10%, two 8%, two 7%, one 6% and one 5%. A great deal of inconsistency is apparent in regard to regulating absorption.

It is now quite evident that restriction as to the proportion of air space which block or tile may have serves no practical purpose and should be eliminated from ordinance provisions. American Concrete Institute specifications and the Hoover codes are without reference to relative volume of air space. Thirteen of the codes listed limit air spaces to proportions varying from 20 to 50%, nevertheless.

Concrete Products Book

THE educational and inspirational viewpoints have been emphasized in a recent bulletin published by the Sandusky Cement Co. under the title of "Medusa Concrete Products Book." An illuminated cover adds to the attractiveness of the work, and a wealth of illustrative material shows what can be done with concrete products, both for utility and beauty.

Officers of the Sandusky company were among the pioneers in the development of concrete products, and they now are able to say that these products "have finally reached the degree of perfection that makes them worthy contenders in comparison with all other materials."

The book is filled with designs and instructions for manufacture of many concrete products.

Building Code Regulations Affecting Concrete Block and Brick and Concrete Structural Tile

Name of Building Code and Year of Issue	Required Compressive Strength in Lbs. per Sq. In. — Ultimate: (a) Solid block (b) Hollow " (c) Brick	Required Compressive Strength in Lbs. per Sq. In. — Working Stress: (a) Solid block (b) Hollow " (c) Brick	Allowable Absorption of Water (a) Block or tile (b) Brick	Maximum Percentage of Hollow Space	Minimum Web Thickness in Hollow Units	Minimum Wall Thickness of Hollow Units	Allowable Wall Height of Hollow Units	Classes of Buildings in Which Hollow Units Are Permitted	Permitted in Foundation Walls?	Hollow Units — Brand or Mark Required?	Hollow Units — Date of Manufacture Required?	Hollow Units — Permitted in Fire Limits?
1	2	3	4	5	6	7	8	9	10	11	12	13
††American Concrete Inst. (1924)	(b) 1200 & 700 250 (c) 1500	—	(a) 14 lbs. of water per cu. ft. of concrete in unit. (b) 15 lbs. of water per cu. ft. of material	No restrictions.	No restrictions.	—	No restrictions. Is governed by working stress	All classes	Yes	—	No	Yes
†† Hoover Dwelling Code (1923)*	(b) 700 (c) 1500	None stated This code applies to dwellings only	(a) 10% of weight of unit. (b) 10% for face brick and 12% for common.	No restriction Is governed by strength requirement	No restrictions.	Minimum of 4" for interior bearing walls; 8" for exterior walls in both stories of 2-story dwellings.	—	This code applies to dwelling houses only.	Yes	—	No	Yes
†† Hoover Masonry Wall Code (1925)**	(b) 700 (c) 1500	(b) 80 (c) 170	(a) 14 lbs. of water per cu. ft. of material. (b) 15 lbs. of water per cu. ft. of material. Absorption test waived under certain conditions.	No restrictions	No restrictions	Walls of hollow units same thickness as solid masonry with few minor exceptions.	50 ft. above foundation wall.	All classes	Yes	—	No	Yes
Albany (1918)	(b) 800	(b) 110	(a) 10% of weight of unit.	$33\frac{1}{3}$	$1\frac{1}{2}$" for bearing block $\frac{5}{8}$" for partition block.	Same as for brick walls. Minimum of 8"	3 stories or 42 ft.	All classes up to 3 stories.	Yes	Yes	No	Yes
†Baltimore (Proposed 1920)	(a) 1500 (b) 700	—	(a) 7% of weight of unit.	35 to 45	At least $\frac{1}{4}$ of height of web	1" less than brick wall	4 stories	All classes up to 4 stories	Yes—If air spaces are filled with concrete	No	No	Yes
Birmingham (1912)	(b) 1000	(b) 110	(a) 15% of weight of unit.	25	At least $\frac{1}{4}$ of height of web.	8" minimum, as for brick walls.	No restrictions	All classes.	Yes	Yes	Yes	Yes
†Camden (1922)	(a) 1200 (b) 750	(a) and (b) $\frac{1}{8}$ of ultimate compressive strength if laid in portland cement mortar.	(a) $1\frac{1}{2}$ lbs. of water per cu. ft. of concrete	No restrictions. Is governed by strength requirements.	No restrictions.	*** 8" for both stories of 2-story dwellings.	40 ft.	All classes up to 40 ft. high.	Yes	Yes	No	Yes
††Cincinnati (1924) (Ordinance No. 80-1924)	(a) 1500-1200 (b) 1000-750 (c) 1500-1200	(a) $\frac{1}{6}$ of crushing strength of unit, but not over 250 lbs. (b) $\frac{1}{6}$ of crushing strength of unit, but not over 250 lbs. (c) Same as (a).	(a) 14 lbs. of water per cu. ft. of concrete in the unit. (b) Same as (a). Absorption test not required in units not exposed to soil or weather	No restrictions. Is governed by strength requirements.	No restrictions	8" for both stories of 2-story dwellings. Also 8" minimum for foundation walls not deeper than 4'-6" in 1-story and 2-story buildings.	40 ft. above first floor level.	All classes wherever solid masonry is permitted.	Yes	Yes	No	Yes
Cleveland (1917)	1200 on net section	200 on net section	(a) 6% of weight of unit.	No restrictions	At least $\frac{1}{4}$ of height of web	Same as for brick walls.	3 stories	All classes up to 3 stories	Yes	Yes	Yes	Yes
††Columbus (1923) (Ord. No. 33,743)	(a) 1500 (b) 1000 (c) 1500	(a) 300 (b) 200 (c) 300	(a) 10% of weight of unit (b) same as (a)	No restrictions. Is governed by strength requirements	No restrictions	8" for both stories of 2-story dwellings	No restrictions	All classes	Yes	Yes	No	Yes
†Dayton (1917)	—	(b) 150	—	50	Height of web not more than $4\frac{1}{2}$ times thickness	Same as for brick walls.	3 stories or 36 ft. for bearing walls.	All buildings of dwelling house class. Not for bearing walls in warehouse class.	Yes—In buildings of the dwelling house class.	No	Yes	Yes
†Denver (1922)	(b) 700	(b) 60	—	—	No restrictions Is governed by ultimate strength	Same as for brick walls.	40 ft.	All classes up to 40 ft. high	Yes	No	No	Yes
†Detroit (1922)	1500 on net section (?)	Not clear Probably 110	(a) 5% of weight of unit.	35 to 45	No restrictions	Same as for brick walls. 8" = 1 brick length	4 stories	All classes up to 4 stories	Yes	Yes	No	Yes
† Erie (1923)	Same as American Concrete Institute	—	(a) 14 lbs. of water per cu. ft. of concrete in the unit	No restrictions. Is governed by strength requirement	No restrictions	Same as for brick walls	No restrictions	All classes	Yes	Yes	No	Yes
Jacksonville Fla.-(1913)	(b) 1000	(b) 110	—	$33\frac{1}{3}$	$\frac{1}{4}$ of height of web	Same as for brick walls	No restrictions. Is governed by unit working stress.	All classes	Yes	No	No	Yes
†Louisville (1913)	(a) 1500	(a) 150	(a) 7% of weight of unit	50	$\frac{2}{3}$ of height of web	10% less than for brick walls.	3 stories	All classes	Yes	Yes	Yes	Yes
†Memphis (1912)	(a) 1500	(a) 150	(a) 15% of weight of unit.	50	$\frac{2}{3}$ of height of web	10% less than for brick walls	No restrictions. Is governed by unit working stress.	All classes	Yes	Yes	Yes	Yes
Milwaukee (1917)	(b) 700	(b) 60	(a) 8% of weight of unit.	35.	No restrictions	12" minimum for warehouse class 10" minimum for dwelling house class	60 ft.	All classes up to 60 ft. high	Yes	Yes	Yes	Yes
New Orleans (1913)	(b) 1000	(b) 100	(a) 15% of weight of unit	45	$1\frac{1}{2}$" thick	Same as for brick walls.	Height limit same as for brick walls.	All classes	Yes	Yes	No	Yes
†New York (1922)	(b) 750	(a) 150 (b) ·75	(a) 12% of weight of unit.	No restriction. Is governed by strength of block.	No restrictions	Same as for brick walls.	40 ft	All classes up to 40 ft. high	Yes—If air spaces are filled with concrete.	Yes	No	Yes
†† Omaha (1923)	(b) 1000	(?)	(a) 10% of weight of block or tile.	No restrictions. Is governed by strength requirements.	$\frac{3}{4}$" for concrete structural tile. Transverse webs in block 1" Longitudinal webs $1\frac{1}{4}$"	Same as for brick walls. (8", 12" etc.)	No restrictions Is governed by working stress	All classes	Yes	No	No	Yes
Philadelphia (1921)	(b) 1000	(b) 111 (8 tons per sq. ft.)	—	20 to 33	At least $\frac{1}{4}$ of height of web.	Same as for brick walls	6 stories	All classes up to 6 stories if approved by Building Inspection Department.	(?)	Yes	No	Yes
†Pittsburgh (1921)	(a) 1500 (b) 900	(a) 200 (b) 130	(a) 10% of weight of unit	No restrictions Is governed by strength requirements.	No restrictions	Same as for brick walls	No restrictions. Is governed by unit working stress.	All classes	Yes	Yes	No	Yes
Providence (1918)	(b) At least 10 times actual working stress	(b) 140	—	40% for buildings not over 3 stories. Less for higher buildings	No restrictions. Is governed by ultimate strength	Same as for brick walls.	6 stories	All classes	Yes	Yes	No	Yes
Rochester (1911)	(b) 450	$\frac{1}{10}$ of ultimate strength	—	$33\frac{1}{3}$	No restrictions	Same as for brick walls.	3 stories or 43 ft.	All classes	Yes	Yes	No	Yes
Salt Lake City (1916)	—	$\frac{1}{10}$ of ultimate strength	(a) 10% of weight of block.	—	—	Same as for brick walls.	3 stories or 40 ft.	All classes	?	Yes	No	Yes

† Requirements apply to concrete structural tile as well as to concrete block.
†† Requirements apply to concrete brick as well as to block and tile.
* Published by the U.S. Department of Commerce in January, 1923, under the title of "Recommended Minimum Requirements for Small Dwelling Construction."
** Published by the U.S. Department of Commerce in 1925, under the title of "Recommended Minimum Requirements for Masonry Wall Construction."
& The American Concrete Institute "Proposed Standard Specifications for Concrete Building Block and Concrete Building Tile" call for an ultimate crushing strength, on gross area, of 1200 lbs. per sq. in. for heavy load-bearing block or tile, 700 lbs. for load-bearing, and 250 lbs. for non-load-bearing block or tile. See also the American Concrete Institute "Proposed Standard Specifications for Concrete Brick."
*** In Camden, N.J., the wall thickness of 1-story and 2-story dwellings of concrete block and tile may be 12" for the basement wall and 8" above the basement wall. In 3-story dwellings the basement wall must be 16" thick, the first story wall 12", and the upper two stories 8"

This tabulation covers practically every phase of restriction to be found in building codes

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., at producing point or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Chaumont, N. Y.	.50	1.75	1.75	1.50	1.50	1.50
Chazy, N. Y.	.75	1.65	1.65	1.40	1.40	1.40
Cobleskill, N. Y.	1.50	1.35	1.25	1.25	1.25	....
Danbury, Conn.	1.50@2.00	2.00	1.75	1.50	1.35	1.25
Dundas, Ont.	.53	1.05	1.05	.90	.90	.90
Frederick, Md.	.50@ .75	1.25@1.35	1.20@1.30	1.10@1.20	1.05@1.10	1.05@1.10
Munns, N. Y.	1.00	1.35	1.35	1.25	1.25	....
Northern New Jersey	1.60	1.50@1.80	1.30@2.00	1.40@1.60	1.40@1.60	....
Prospect, N. Y.	1.00	1.50	1.40	1.30	1.30	....
Watertown, N. Y.	.50	....	1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL						
Afton, Mich.	....	....	.50	....	....	1.50
Alton, Ill.	1.85	....	1.85	....	....	....
Bloomville. Middlepoint, Dunkirk, Bellevue, Waterville, No. Baltimore, Holland, Kenton, New Paris, Ohio; Monroe, Mich.; Huntington, Bluffton, Ind.	1.00	1.10	1.10	1.00	1.00	1.00
Buffalo and Linwood, Iowa	1.00	....	1.10	.90	.95	.95
Carey, Ohio	1.05	1.05	1.05	1.05	1.05	1.05
Chasco, Ill.	1.00@1.30	....	1.00@1.15	....	1.00@1.15	....
Columbia and Krause, Ill.	1.00@1.50	.90@1.10	1.20@1.35	1.00@1.20	.90@1.20	....
			Flux 1.50@1.75			
Gary, Ill.	1.00	1.25	1.25	1.25	1.25	1.25
Greencastle, Ind.	1.25	1.25	1.15	1.05	1.05	.95
Milltown, Ind.	....	90@1.10	.90@1.15	.90@1.00	.85@.90	.85@.90
River Rouge, Mich.	1.20	1.20	1.20	1.20	1.20	1.20
St. Vincent de Paul, Que.	.75	1.25	.90	.85	.80	1.00
Sheboygan, Wis.	1.10	1.10	1.10	1.10	1.10	....
Toledo, Ohio	1.60	1.70	1.70	1.60	1.60	1.60
Toronto, Ont.	1.50	2.00	2.00	1.85	1.85	1.85
Stone City, Iowa	.75	....	†1.10	1.05	1.00	....
Waukesha, Wis.	.90	.90	.90	.90	.90	.90
SOUTHERN:						
Alderson, W. Va.	.50	1.50	1.40	1.30	1.20	....
Allgood, Ala.	Crusher run, fines out, for flux, 1.00 per net ton					
Brooksville, Fla.	.75	....	2.65	2.65	2.40	2.00
Cartersville, Ga.	1.25	1.50	1.50	1.25	1.25	....
Chico, Texas	1.00	1.35	1.30	1.25	1.15	1.10
El Paso, Tex.	1.00	1.00	1.00	1.00	....	....
Ft. Springs, W. Va.	.50	1.60	1.50	1.35	1.25	....
Kendrick and Santos, Fla.	3½ in. and less, 1.00 per ton					
New Braunfels, Tex.	.30@1.00	1.00@1.30	1.00@1.30	.70@1.00	.70@ .90	....
Olive Hill, Ky.	.50@1.00‡	1.00	1.00	1.00	1.00	1.00
Rocky Point, Va.	.50@1.00	1.40@1.60	1.30@1.40	1.15@1.35	1.10@1.20	1.00@1.05
WESTERN:						
Atchison, Kans.	.25	2.00	2.00	2.00	2.00	1.80
Blue Springs & Wymore, Neb.	.25	1.45	1.45	1.35c	1.25d	1.20
Cape Girardeau, Mo.	1.25	1.25	1.25	1.25	1.10	....
Kansas City, Mo.	.75	1.50	1.50	1.50	1.50	1.50
Rock Hill, St. Louis Co., Mo.	1.40	1.40	1.40	1.40	1.35	1.35

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.80	1.70	1.45	1.20	1.05	....
Duluth, Minn.	.90	2.25	1.90	1.50	1.35	1.35
Dwight, Calif.	1.00	1.00	1.00	.90	.90	....
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
Knippa, Tex.	2.50	2.25	1.55	1.35	1.25	1.25
New Haven, New Britain, Meriden & Wallingford, Conn.	.80	1.70	1.45	1.20	1.05	1.05
Northern New Jersey	1.50	2.00	1.80	1.40	1.40	....
Oakland and El Cerritto, Cal.	1.00	1.00	1.00	.90	.90	....
San Diego, Calif.	....	2.75	2.55	2.35	2.35	....
Sheboygan, Wis.	1.00	1.10	1.10	1.10	1.10	....
Springfield, N. J.	1.70	2.10	2.10	1.70	1.60	1.60
Toronto, Ont.	....	3.53@4.00	....	3.00@3.75	....	....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley, Montello and Red Granite, Wis.—Granite	1.80	1.70	1.50	1.40	1.40	....
Coldwater, N. Y.—Dolomite			1.50 all sizes			
Columbia, S. C.	.75	2.00	1.75	1.75	1.60	1.60
Eastern, Penn.—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40
Eastern Penn.—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Lithonia, Ga.—Granite	.75	2.00	1.75b	1.35	....	....
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	....
Middlebrook, Mo.	3.00@3.50	....	2.00@2.50	2.00@2.25	....	1.25@3.00
Richmond, Calif.—Quartzite	.75	....	1.00	1.00	1.00	....
Somerset, Pa. (sand-rock)	1.85@2.00a	....	1.35@1.50	....	1.00@1.50	....
Toccoa, Ga.—Granite	.50	1.50	1.50	1.40	1.35	1.35

*Cubic yd. †1 in. and less. ‡Two grades. ¶Rip rap per ton. (a) Sand. (b) to ½ in. (c) 1 in., 1.40. (d) 2 in., 1.30. (e) Dust. (f) ¼ in. (h) less 10c discount. (i) 1 in., 1.40. (k) on cars, less 5c per ton discount.

Agricultural Limestone

(Pulverized)

Alderson, W. Va.—50% thru 50 mesh	1.50
Alton, Ill.—Analysis 99% $CaCO_3$, 0.3% $MgCO_3$; 90% thru 100 mesh	6.00
Asheville, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk	2.75
Atlas, Ky.—90% thru 100 mesh	2.00
50% thru 100 mesh	1.00
Belfast and Rockland, Me. (rail), Lincolnville, Me. (water), analysis $CaCO_3$ 90.04%; $MgCO_3$ 1.5%, 100% thru 14 mesh, bags	4.50
Bulk	3.50
Bettendorf and Moline, Ill.—Analysis, $CaCO_3$, 97%; 2% $MgCO_3$; 50% thru 100 mesh, 1.50; 50% thru 4 mesh	1.50
Branchton and Osborne, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers)	5.00
Cape Girardeau, Mo.—Analysis, 93% $CaCO_3$, 3.5% $MgCO_3$; pulverized; 50% thru 50 mesh	1.50
Cartersville, Ga.—Pulverized, 2.00; 50% thru 50 mesh	1.75
Chaumont, N. Y.—Pulverized limestone, bags, 4.00; bulk	2.50
Chico, Texas.—50% thru 50 mesh, bulk	1.50
Colton, Calif.—Analysis 90% $CaCO_3$, bulk	4.00
Cypress, Ill.—90% thru 100 mesh	1.35
Henderson, N. C. (paving dust)—80% thru 200 mesh, bags	4.25@ 4.75
Bulk	3.00@ 3.50
Analysis $CaCO_3$, 56%; $MgCO_3$, 42%; 65% thru 200 mesh, bags	3.95
Bulk	2.70
Hillsville, Penn.—Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$; 75% thru 100 mesh; sacked	5.00
Jamesville, N. Y.—Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.00; bulk	2.50
Joliet, Ill.—90% thru 100-mesh	4.24
Knoxville, Tenn.—80% thru 200 mesh, 80% thru 100 mesh, bags, 3.50; bulk	2.50
Marblehead, Ohio—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.00; bulk	3.50
Marion, Va.—Analysis, 90% $CaCO_3$, pulverized, per ton	2.00
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 90% thru 100 mesh	3.90@ 4.50
Milltown, Ind.—Analysis, 94.50% $CaCO_3$, 33% thru 50 mesh, 40% thru 50 mesh; bulk	1.35@ 1.60
Olive Hill, Ky.—50% thru 50 mesh, 2.00; 90% thru 4 mesh	1.00
Piqua, Ohio—Total neutralizing power 95.3%; 99% thru 10, 60% thru 50; 50% thru 100	2.50@ 2.75
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.10; bulk	3.60
99% thru 100, 85% thru 200; bags, 7.00; bulk	5.50
Rocky Point, Va.—Analysis, $CaCO_3$, 95%; $MgCO_3$, 0.75%; 50% thru 100 mesh, burlap bags, 3.50; paper, 3.25; bulk	2.00
Toledo, Ohio, 30% through 50 mesh	2.25
Waukesha, Wis.—90% thru 100 mesh, 4.50; 50% thru 100 mesh, 2.10; 90% thru 50 mesh	1.65
Watertown, N. Y.—Analysis, 96-99% $CaCO_3$; 50% thru 100 mesh; bags, 4.00; bulk	2.50
West Stockbridge, Mass.—Analysis 90% $CaCO_3$, 50% thru 100 mesh; cloth bags, 4.75; paper, 4.25; bulk	3.25

Agricultural Limestone

(Crushed)

Alton, Ill.—Analysis 99% $CaCO_3$, 0.3% $MgCO_3$; 50% thru 4 mesh	3.00
Atlas, Ky.—50% thru 4 mesh	.50
Bedford, Ind.—Analysis, 98.5% $CaCO_3$, 0.5% $MgCO_3$; 90% thru 10 mesh	1.50
Brandon and Middlebury, Vt.—Pulverized, bags, 5.50; bulk	3.50

(Continued on next page)

Agricultural Limestone

Bridgeport and Chico, Texas—Analysis, 94% $CaCO_3$, 2% $MgCO_3$; 100% thru 10 mesh		1.75
50% thru 4 mesh		1.50
Chasco, Ill.—50% thru 100 mesh		1.20
Chicago, Ill.—50% thru 100 mesh; 90% thru 4 mesh		.80
Columbia, Krause, Valmeyer, Ill.—Analysis, 90% $CaCO_3$; 90% thru 4 mesh		1.35
Cypress, Ill.—90% thru 50 mesh, 50% thru 100 mesh, 90% thru 50 mesh, 90% thru 4 mesh, 50% thru 4 mesh		1.35
Danbury, Conn.—Analysis, 81 to 85% $CaCO_3$	3.75@	4.75
Dundas, Ont.—Analysis, 53.8% $CaCO_3$; $MgCO_3$, 43.3%. 100% thru 10 mesh, 40% thru 50 mesh, 25% thru 100 mesh		1.00
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh		1.50
Garnet, Okla.—All sizes		1.25
Kansas City, Mo.—50% thru 100 mesh		.75
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% through 10 mesh; 46% through 60 mesh		2.00
Screenings (¼ in. to dust)		1.00
Marblehead, Ohio.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$, 32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk		1.60
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 50% thru 50 mesh	1.85@	2.35
Middlepoint, Bellevue, Kenton, Ohio; Monroe, Mich.; Huntington and Bluffton, Ind.—Analysis, 42% $CaCO_3$, 54% $MgCO_3$; meal, 25 to 45% thru 100 mesh		1.60
Moline, Ill., and Bettendorf, Iowa—Analysis, 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh		1.50
Monroe, Mich. — Analysis, $CaCO_3$, 52.03%; 42.25% $MgCO_3$; 30% thru 100 mesh		2.30
Mountville, Va. — Analysis, 62.54% $CaCO_3$; $MgCO_3$, 35.94%, 100% thru 20 mesh; 50% thru 100 mesh bags		5.50
Pixley, Mo.—Analysis, 96% $CaCO_3$; 50% thru 50 mesh		1.25
50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh		1.65
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk	.80@	1.40
Stone City, Iowa. — Analysis, 98% $CaCO_3$; 50% thru 50 mesh		.75
Tulsa, Okla.—Analysis $CaCO_3$, 86.15%, 1.25% $MgCO_3$, all sizes		1.25

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk		3.00
Joliet, Ill.—85% thru 200 mesh		4.25
Piqua, Ohio, sacks, 4.50@5.00 bulk	3.00@	3.50
Rocky Point, Va.—80% thru 200 mesh; bags, 4.25@4.75; bulk	3.00@	3.50
Waukesha, Wis.—90% thru 100 mesh, bulk		4.50

Glass Sand

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

Berkeley Springs, W.Va.—Glass sand		2.25
Buffalo, N. Y.	2.00@	2.50
Cedarville and S. Vineland, N. J.—Damp		1.75
Dry		2.25
Columbus, Ohio	1.25@	1.50
Estill Springs and Sewanee, Tenn.		1.50
Franklin, Penn.		2.00
Gray Summit and Klondike, Mo.		2.00
Los Angeles, Calif.—Washed		5.00
Mapleton Depot, Penn.	2.00@	2.25
Massillon, Ohio		3.00
Mendota, Va.	2.25@	2.50
Mineral Ridge and Ohlton, Ohio		2.50
Oceanside, Calif.		3.00
Ottawa, Ill.	.75@	1.25
Pittsburgh, Penn.	3.00@	4.00
Ridgway, Penn.		2.50
Rockwood, Mich.	2.75@	3.25
Round Top, Md.		2.25
San Francisco, Calif.	4.00@	5.00
St. Louis, Mo.		2.00
Sewanee, Tenn.		1.50
Thayers, Penn.		2.50
Utica, Ill.	1.00@	1.25
Zanesville, Ohio		2.50

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Beach City, Ohio		1.50@ 1.75
Columbus, Ohio		.30@ 1.00
Dresden, Ohio		1.00
Eau Claire, Wis.	4.25	.60@ 1.25
Estill Springs and Sewanee, Tenn.	1.35@ 1.50	1.35@ 1.50

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in and less
EASTERN:						
Ambridge & So. H'g'ts, Penn.	1.25	1.25	1.15	.85	.85	.85
Attica and Franklinville, N. Y.	.75	.75	.75	.75	.75	.75
Boston, Mass.‡	1.40	1.40	2.25		2.25	2.25
Buffalo, N. Y.	1.10	.95			.85	
Erie, Pa.		1.00*		1.50*	1.75*	
Farmingdale, N. J.	.58	.48	.75	1.20	1.10	
Hartford, Conn.	.65*					
Leeds Junction, Me.		.50	1.75		1.35	1.25
Machias Jct., N. Y.		.75	.75		.75	
Montoursville, Penn.	1.00	1.00	1.00	.75	.75	.75
Northern New Jersey	.40@ .50	.40@ .50	1.25	1.25	.90@1.25	
Olean, N. Y.		.75	.75		.75	
Portland, Me.	1.00	1.00	2.25		2.00	
Shining Point, Penn.			1.00	1.00	1.00	1.00
Somerset, Pa.		1.85			1.50	
South Heights, Penn.	1.25	1.25	.85	.85	.85	.85
Washington, D. C.	.85	.85	1.70	1.50	1.30	1.30
CENTRAL:						
Algonquin and Beloit, Wis.	.50	.40	.60	.60	.60	.60
Appleton and Mankato, Minn.		.45	1.25	1.25	1.25	1.25
Attica, Ind.	All sizes .75@.85					
Aurora, Oregon, Sheridan, Moronts, Yorkville, Ill.	.40@ .50	.40@ .60	.20@ .50	.50@ .60	.60	.55@ .60
Barton, Wis.		.75		.75	.75	.85
Chicago, Ill.	.70	.60	.50	.60	.60	.60
Columbus, Ohio		.70	.70	.70	.70	
Des Moines, Iowa		.40	1.50			
Eau Claire, Wisc.	.60@1.25	.45	.85@1.25		.95	
Elgin, Ill.		.20*	.50*	1.50*	1.50*	1.50*
Elkhart Lake, Wis.	.50	.30	.40	.50	.50	.40
Ferrysburg, Mich.		.50@ .80	.60@1.00	.60@1.00		.50@1.25
Ft. Dodge, Iowa	.85	.85	2.05	2.05	2.05	2.05
Ft. Worth, Texas	2.00	2.00	2.00	2.00	2.00	2.00
Grand Haven, Mich.		.60@ .80		.60@1.00		.60@1.00
Grand Rapids, Mich.		.50		.80	.80	.70
Hamilton, Ohio		1.00			1.00	
Hersey, Mich.		.50				.70
Humboldt, Iowa	.50	.50	1.50	1.50	1.50	1.50
Indianapolis, Ind.	.60	.60		.90	.75@1.00	.75@1.00
Joliet, Plainfield and Hammond, Ill.	.60	.50	.50	.60	.60	.60
Mason City, Iowa	.50	.50	1.45	1.45	1.45	1.35
Mattoon, Ill.	.75	.75	.75	.75	.75	.75
Milwaukee, Wis.		1.01	1.21	1.21	1.21	1.21
Moline, Ill.	.60@ .85	.60@ .85	1.00@1.20	1.00@1.20	1.00@1.20	1.00@1.20
Northern New Jersey	.70	.70			1.60	
Palestine, Ill.	.75	.75	.75	.75	.75	.75
Pittsburgh, Penn.	1.25	1.25	.85	.85	.85	.85
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
St. Louis, Mo.	.93	1.45	1.55a	1.45	1.45	1.45
Terre Haute, Ind.	.75	.60	.90	.75	.75	.75
Wolcottville, Ind.	.75	.75	.75	.75	.75	.75
Waukesha, Wis.		.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	1.50	1.25	1.10	1.10
Zanesville, Ohio		.60	.50	.60	.80	
SOUTHERN:						
Charleston, W. Va.		All sand, 1.40.		All gravel, 1.50.		
Chattanooga, Tenn.		1.65			1.45	
Chattahoochie River, Fla.		.70		1.75		
Eustis, Fla.	.60@ .70					
Knoxville, Tenn.	1.00	1.00	1.20	1.20	1.20	1.20
Lindsay, Texas					.55	
Macon, Ga.	.50	.50				
New Martinsville, W. Va.	1.00	.90@1.00		1.20@1.30		.80@ .90
Roseland, La.	.50	.40	2.25	1.25	1.00	
WESTERN:						
Kansas City, Mo.	1.00	.70				
Los Angeles district (bunkers)†	1.50	1.40	1.85	1.85	1.85	1.85
Phoenix, Ariz.	1.25*	1.00*	2.50*	2.00*	1.75*	1.50*
Pueblo, Colo.	.80	.65		1.35		1.20
San Diego, Calif.	.65@ .75	.65@ .75	1.50	1.30	1.10	1.10
Seattle, Wash. (bunkers)	1.50*	1.50*	1.50*	1.50*	1.50*	1.50*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Algonquin and Beloit, Wis.			Dust to 3 in., .40			
East Hartford, Conn.			Sand, .75*			
Ferrysburg, Mich.						.65@1.00
Gainesville, Texas		.95				.55
Grand Haven, Mich.						.80
Grand Rapids, Mich.				.60		
Hamilton, Ohio					.70	
Hersey, Mich.				.55		
Indianapolis, Ind.		Mixed gravel for concrete work, at .65				
Joliet, Plainfield and Hammond, Ill.	.35	1.25				
Lindsay, Texas						.55
Macon, Ga.	.35	.35				
Mankato, Minn.			Pit run sand, .70			
Moline, Ill. (b)	.60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Ottawa, Oregon, Moronts and Yorkville, Ill.			Ave. .60 per ton all sizes			
Roseland, La.						.60
Somerset, Penn.		1.85@2.00		1.50@1.75		
St. Louis, Mo.			Mine run gravel, 1.55 per ton			
Shining Point, Penn.			Concrete sand, 1.10 ton			
Summit Grove, Ind.	.50	.50	.50	.50	.50	.54
Waukesha, Wis.	.60	.60	.60	.60	.60	.64
Winona, Minn.	.60	.60	.60	.60	[illegible]	.60
York, Penn.	1.10	1.00				

(a) ⅝ in. down. (b) River run. (c) 2½ in. and less.
*Cubic yd. †Include freight and bunkerage charges and truck haul. ‡Delivered on job.
(d) Less 10c per ton if paid E.O.M. 10 days. (e) pit run. (f) plus 15c winter loading charge.

Core and Foundry Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

City or shipping point	Molding, fine	Molding, coarse	Molding, brass	Core	Furnace lining	Sand blast	Stone sawing
Aetna, Ill.				.30@ .35			
Albany, N. Y.	2.25	2.00	2.25			4.00	
Arenzville, Ill.	1.50@1.75			1.00			
Beach City, Ohio	2.00@2.25	2.00		1.75	2.00@2.50		1.75
Buffalo, N. Y.	1.50	1.50		2.00@2.50			
Columbus, Ohio	1.50@2.00	1.25@1.50	2.00@2.50	.30@1.50	1.50@2.00	2.75@3.50	1.50@3.00
Dresden, Ohio	1.40	1.50	1.50	1.25	1.50		
Eau Claire, Wis.						3.00	
Elco, Ill.	Ground silica per ton in carloads—18.00@31.00						
Elnora, N. Y.			1.75				
Estill Springs and Sewanee, Tenn.	1.25			1.25		1.35@1.50	
Franklin, Penn.	1.75	1.75		1.75			
Kasota, Minn.							1.10a
Klondike, Mo.	1.75		2.00	1.75	1.75		1.25
Mapleton Depot, Penn.	2.25	2.00		2.00	2.00	2.25	
Massillon, Ohio	2.50	2.50		2.50	2.50		
Mendota, Va.	Ground flint or silex—16.00@20.00 per ton						
Michigan City, Ind.				.30@ .35			
Montoursville, P'n.				1.25@1.35			
Ohlton, Ohio	1.75*	1.75*	2.00*	2.00*	1.50*	2.50*	1.75*
Ottawa, Ill.	2.50		2.50	1.25	.75	3.50	3.50
Red Wing, Minn.	1.25		1.25	1.50	1.50	3.50	1.50
Ridgeway, Penn.	1.50	1.50					
Round Top, Md.		1.25		1.60		2.25	
San Francisco, Calif.	3.50	4.75	3.50	3.50@5.00	3.50@4.50	3.50@5.00	
Tamalco, Ill.		1.40@1.60					
Tamms, Ill.	Ground silica per ton in carloads—20.00@31.00						
Thayers, Penn.	1.25	1.25		2.00			
Utica, Ill.¶		.50@.85	.50@.90	.60@.75	.60@.90		
Utica, Ill.	.75	.65		.75	.75		
Utica, Penn.	1.75	1.75		2.00			
Zanesville, Ohio	2.00	1.50	2.00	2.00	2.00		

*Green. †Crude silica, crushed and screened, not washed or dried. ‡Plus 75c per ton for winter loading. ¶Crude. §Crude and dry. (a) delivered.

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y., Emporium nd Dubois, Pa.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
Eastern Penn.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Northern, N. J.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
Reading, Pa.	2.50	1.00		1.25			
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05*	1.45*	1.80*	1.45*	1.45*	1.45*	1.45*
Jackson, Ohio		1.05*		1.30*	1.00	1.30*	1.30*
Toledo, Ohio	1.50	1.35	1.35	1.35	1.35	1.35	1.35
Youngst'n, O., dist.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.		1.55*		1.55*	1.55*	1.55*	1.55*
Ensley and Alabama City, Ala.	2.05	.80	1.35	1.25	.90	.90	.80
Longdale, Roanoke, Ruessens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15
Woodward, Ala.	2.05*	.80*	1.35*	1.25*	.90*	.90*	

*5c per ton discount on terms.

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.			12.00					2.15e
Buffalo, N. Y.		12.00	12.00	12.00			10.00	1.95d
Chazy, N. Y.	12.50	10.50	8.00	12.00	11.50	16.50	10.00	2.50_2
Lime Ridge, Penn.							5.00a	
West Stockbridge, Mass.	12.00	10.00	5.60					2.00t
Williamsport, Penn.			10.00				6.00	
York, Penn.		9.50	9.50	10.50	8.50	10.50	8.50	1.65i
CENTRAL:								
Carey, Ohio	12.50	8.50	8.00		9.00		8.50	1.50
Cold Springs, Ohio	12.50	8.50	8.50		9.00		8.00	
Delaware, Ohio	15.00	8.50	8.50	9.00			7.50	1.50
Frederick, Md.		9.50	9.50	9.50	8.00	9.50	7.50	1.45e
Gibsonburg, Ohio	12.50	8.50	8.50		9.00	11.00	8.50	
Huntington, Ind.	12.50	8.50	8.50		9.00		8.00	
Luckey, Ohio	12.50							
Marblehead, Ohio		8.50	8.50		9.00		8.00	1.50w
Marion, Ohio		8.50	.850				8.00	1.70d
Milltown, Ind.		9.00@10.00		10.00p			8.50q	1.40r
Sheboygan, Wis.	11.50						9.50	.95
Tiffin, Ohio					9.00			
White Rock, Ohio	12.50				9.00	11.00	8.00	
Wisconsin points (f)		11.50					9.50	
Woodville, Ohio	12.50	.850	.850		9.00	11.00	9.00	1.50
SOUTHERN:								
Allgood, Ala.	12.50	10.00			8.50		8.50	1.50
El Paso, Tex.							8.00	
Graystone, Ala.	12.50	10.00		12.50			8.50	1.50
Keystone, Ala.		10.00	10.00	10.00	8.50	1.45u	8.50	1.50
Knoxville, Tenn.	20.25	10.00	10.00	10.00			8.50	1.50
Longview, Ala.	12.50	10.00	9.00	10.00			8.50	1.50
Ocala, Fla.		13.00	10.00			1.60	12.00	1.70
Saginaw, Ala.	12.50	10.00	9.00	10.00			8.50	1.50
WESTERN:								
Calcite, Colo.							9.25	
Kirtland, N. M.							15.00	
Limestone, Wash.	15.00	15.00	10.00	15.00	16.50	16.50	16.50	2.09
Dittlinger, Tex.		12.00@13.00					9.50p	1.50_4
San Francisco, Calif.	21.00	19.00	16.50				14.00	2.00
Tehachapi, Calif.			8.00				13.00z	2.20x
Seattle, Wash.	19.00	19.00	12.00	19.00	19.00		18.60	2.30

†50-lb. paper bags; (a) run of kilns; (c) wooden, steel 1.70; (d) steel; (e) per 180-lb. barrel; (f) dealers' prices, net 30 days less 25c disc. per ton on hydrated lime and 5c per bbl. on lump if paid in 10 days; (i) 180-lb. net barrel, 1.65; 280-lb. net barrel, 2.65; (p) to 11.00; (q) to 8.75; (r) to 1.50; (s) in 80-lb. burlap sacks; (t) to 3.00; (u) two 90-lb. bags; (v) oil burnt; wood burnt 2.25@2.50; (x) wood, steel 2.30; (z) to 15.00; (*) quoted f.o.b. New York; (‡) paper bags; (w) to 1.50 in two 90-lb. bags, wood bbl. 1.60; (¶) to 10.00; (1) 80-lb. paper bags; (2) to 3.00; (3) to 9.00; (4) to 1.60. (5) to 16.00; (6) wood bbl., steel, 1.80.

Miscellaneous Sands

(Continued)

City or shipping point	Roofing sand	Traction
Gray Summit and Klondike, Mo.		1.75
Mapleton Depot, Penn.	2.00	2.00
Massillon, Ohio		2.25
Mineral Ridge and Ohlton, Ohio	*1.75	*1.75
Montoursville, Penn.		1.25
Ottawa, Ill.	1.25	
Red Wing, Minn.		1.25
Round Top, Md.	2.25	1.75
San Francisco, Calif.	3.50@ 4.50	3.50@ 4.50
Thayers, Penn.		2.25
Utica, Ill.	1.00@ 3.00	1.00
Warwick, Ohio		2.25
Zanesville, Ohio		2.50

*Wet.

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point,

Baltimore, Md.:	
Crude talc (mine run)	3.00@ 4.00
Ground talc (20-50 mesh), bags	10.00
Cubes	55.00
Blanks (per lb.)	.08
Pencils and steel worker's crayons	.08
per gross	1.25
Chatsworth, Ga.:	
Crude Talc	5.00
Ground (150-200 mesh), bulk	10.00
Pencils and steel worker's crayons, per gross	1.00@ 2.00
Chester, Vt.:	
Ground talc (150-200 mesh), bulk	9.00@10.00
Including bags	10.00@11.00
Chicago and Joliet, Ill.:	
Ground (150-200 mesh), bags	30.00
Dalton, Ga.:	
Crude talc	5.00
Ground talc (150-200) bags	10.00@12.00
Pencils and steel workers' crayons, per gross	1.00@ 1.50
Emeryville, N. Y.:	
(Double air floated) including bags; 325 mesh	14.75
200 mesh	13.75
Hailesboro, N. Y.:	
Ground white talc (double and triple air floated) including bags, 300-350 mesh	15.50@20.00
Henry, Va.:	
Crude (mine run)	3.50@ 4.50
Ground talc (150-200 mesh), bulk	9.00@14.50
Joliet, Ill.:	
Roofing talc, bags	10.00
Ground talc (200 mesh), bags	30.00
Keeler, Calif.:	
Ground (200-300 mesh), bags	20.00@30.00
Natural Bridge, N. Y.:	
Ground talc (300 mesh), bags	13.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 65-70%	4.00@ 5.00
Mt. Pleasant, Tenn.—B.P.L. 75%	5.50@ 6.00
Tennessee—F.O.B. mines, gross ton, unground brown rock, B.P.L. 72%	5.00
B.P.L. 75%	6.00
Twomey, Tenn.—B.P.L. 65%, 2000 lb.	7.25@ 8.25

Ground Rock

(2000 lbs.)

Centerville, Tenn.—B.P.L. 65%	7.00
Gordonsburg, Tenn.—B.P.L. 65-70%	4.00@ 4.50
Mt. Pleasant, Tenn.—B.P.L. 65%	8.00
Twomey, Tenn.—B.P.L. 65%	8.00

Florida Phosphate

(Raw Land Pebble)

(Per Ton.)

Florida—F. O. B. mines, gross ton,	
68/66% B.P.L., Basis 68%	3.25
70% min. B.P.L., Basis 70%	3.75
72% min. B.P.L., Basis 72%	4.25
75/74% B.P.L., Basis 75%	5.25
77/76% B.P.L., Basis 77%	6.25

Mica

Prices given are net, F.O.B. plant or nearest shipping point.

Pringle, S. D.—Mine run, per ton	125.00@150.00
Punch mica, per lb.	.06
Scrap, per ton, carloads	20.00
Rumney Depot, N. H.—per ton, mine run	360.00
Mine scrap	22.50
Clean shop scrap	25.00
Dry ground, 20 mesh	28.00
40 mesh	35.00
60 mesh	40.00
200 mesh	80.00
Punch mica, per lb.	.10

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Barton, Wis., f.o.b. cars		10.50
Brandon, Vt.—English pink and English cream	*11.00	*11.00
Brandon grey	*11.00	*11.00
Brighton, Tenn.—Pink		†6.00
Buckingham, Que.—Buff stucco dash		‡12.00@14.00
Chicago, Ill. — Stucco chips, in sacks f.o.b. quarries		17.50
Crown Point, N. Y.—Mica Spar		8.00@10.00
Easton, Penn., and Phillipsburg, N. J.	10.00@16.00	10.00@16.00
Haddam, Conn. — Fel-stone buff	15.00	15.00
Harrisonburg, Va.—Bulk marble (crushed, in bags)	†12.50	†12.50
Ingomar, Ohio — Concrete facings and stucco dash		6.00@18.00
Middlebrook, Mo.—Red		20.00@25.00
Middlebury and Brandon, Vt.—Middlebury white		‡9.00
Milwaukee, Wis.		14.00@34.00
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Red Granite, Wis.		7.50
Stockton, Calif. — "Natrock" roofing grits		15.00@20.00
Tuckahoe, N. Y.—Tuckahoe white	12.00	12.00
Warren, N. H.—cement facing (mica), per ton		7.50
Wauwatosa, Wis.		20.00@32.00
Wellsville, Colo.—Colorado Travertine Stone	15.00	15.00

†C.L. L.C.L. 17.00.
*C.L. including bags; L.C.L. 14.50
‡C.L. including bags, L.C.L. 10.00.

Potash Feldspar

Auburn and Brunswick, Me.—Color, white; 98% thru 140 mesh bulk	19.00
Buckingham, Que.—Color, white; analysis, K_2O, 12-13%; Na_2O, 1.75%; bulk	9.00
De Kalb Jct., N. Y.—Color, white; bulk (crude)	9.00
East Hartford, Conn.—Color, white, 95% through 60 mesh, bags	16.00
96% thru 150 mesh, bags	23.00
East Liverpool, Ohio—Color, white; 98% thru 200 mesh, bulk	19.35
Soda feldspar, crude, bulk, per ton	22.00
Erwin, Tenn.—Color, white; analysis, 12.07% K_2O, 19.34% Al_2O_3; Na_2O, 2.92%; SiO_2, 64.76%; Fe_2O_3, .36%; 98.50% thru 200 mesh, bags, 16.90; bulk	15.50
Glen Tay Station, Ont., color, red or punk; analysis: K_2O, 12.81%, crude (bulk	6.75@ 7.00
Keystone, S. D.—Prime white, bulk (crude)	8.00
Los Angeles, Calif.—Color, white; analysis, K_2O, 10.35%; Na_2O, 3.62%; Al_2O_3, 18.71%; SiO_2, 65.48%; Fe_2O_3, .17%; 95% thru 200 mesh, bags included, carloads	22.00
Bulk	20.00
Murphsboro, Ill.—Color, snow white; analysis SiO_2, 64.4%; K_2O, 13%; Na_2O, 2.5%; Fe_2O_3, 0.07%; Al_2O_3, 19.3%; 98% thru 200 mesh, bags	21.00
Bulk	20.00

Penland, N. C.—Color, white; crude, bulk	8.00
Ground, bulk	16.50
Tenn. Mills—Color, white; analysis K_2O, 18%; Na_2O_3, 10%; 68% SiO_2; 99% thru 200 mesh; bulk	18.00
99% thru 140 mesh, bulk	16.00
Toughkenamon, Pa.—Color, white to light cream; 98% thru 150 mesh, bags, 11.00@13.00; bulk	10.00
Toronto, Can.—Color, flesh; analysis K_2O, 12.75%; Na_2O, 1.96%; crude	7.50@ 8.00
Trenton, N. J.—Crude, bulk	12.00@27.00
99% thru 140 mesh; bulk	16.00
(Bags 11 cents each, non-returnable)	

Blended Feldspar
(Pulverized)

Tenn. Mills—Bulk	16.00@20.00

Chicken Grits

Afton Mich. (limestone) per ton	10.00
Belfast and Rockland, Me.—(Limestone), bags, per ton	‡10.00
Brandon and Middlebury, Vt., per ton	12.00‡
Centerville, Iowa (gypsum) per ton	18.00
Chico, Texas (limestone), 100 lb. bags, per ton	8.00@ 9.00
Danbury, Conn. (limestone)	7.00@ 9.00
Knoxville, Tenn. (limestone), bags, per ton 7.00; bulk	5.00
Los Angeles Harbor (limestone), 100-lb sack, 1.00; sacks, per ton, 8.50@9.50†; bulk, per ton	6.00@7.00†
Toughkenamon, Pa.—(Feldspar) 100-lb. bags, 1.00; bulk, per ton	10.00
Gypsum, Ohio.—(Gypsum) per ton	10.00
Limestone, Wash. (limestone) per ton	12.50
Rocky Point, Va. (limestone) 100 lb. bags, 75c; sacks, per ton, 6.00 bulk	5.00
Seattle, Wash.—(Limestone), bulk, per ton	12.50
Warren, N. H.—(Mica) per ton	7.70@7.90‡
Waukesha, Wis.—(Limestone), per ton	8.00
West Stockbridge, Mass.—(Limestone) bulk	7.50@9.00*

*L.C.L.
†Less than 5-ton lots.
‡C.L.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.50
Boston, Mass.	*17.00
Brighton, N. Y.	*19.75
Dayton, Ohio	12.50@13.50
Detroit, Mich.	14.50@17.50*
Farmington, Conn.	17.00
Flint, Mich.	¶12.50@16.00
Grand Rapids, Mich	12.00
Hartford, Conn.	*19.00
Jackson, Mich.	12.25
Lancaster, N. Y.	13.00
Madison, Wis.	†a14.00
Michigan City, Ind.	11.00
Milwaukee, Wis.	*13.00
Minneapolis and St. Paul, Minn	11.25
Minnesota Transfer	10.00
New Brighton, Minn	10.00
Pontiac, Mich.	13.00
Portage, Wis.	15.00
Prairie du Chien, Wis	18.00@22.50
Rochester, N. Y.	19.75
Saginaw, Mich.	13.00
San Antonio, Texas	16.00
Sebewaing, Mich.	12.00
Syracuse, N. Y.	18.00@20.00*
Toronto, Canada	13.00@15.60†
Toronto, Canada	13.00
Wilkinson, Fla.	10.00@12.00

*Delivered on job. †Delivered in city limits. ‡Less 5%. ¶Dealers' price. (a) Less 1.00 E.O.M. 10 days.

Portland Cement

Prices per bag and per bbl, without bags net in carload lots.

	Per Bag	Per Bbl.
Albuquerque, N. M.		3.37
Atlanta, Ga.		2.35
Baltimore, Md.		1.70@2.35
Birmingham, Ala.		2.30
Boston, Mass.		1.81@2.63‡
Buffalo, N. Y.		1.67@2.38‡
Butte, Mont.	.90¼	3.61
Cedar Rapids, Iowa		2.34‡
Charleston, S. C.		2.35
Cheyenne, Wyo.	.82¾	3.31
Cincinnati, Ohio	56¾	2.37‡
Cleveland, Ohio		2.29‡
Chicago, Ill.		2.10‡
Columbus, Ohio	.57½	
Dallas, Texas		2.10
Davenport, Iowa		2.29‡
Dayton, Ohio	.57	
Denver, Colo.	.66¼	2.65
Detroit, Mich.		2.15‡
Duluth, Minn.		2.09‡
Houston, Texas		2.60
Indianapolis, Ind.	.53½	
Jackson, Miss.		2.60
Jacksonville, Fla.		2.20
Jersey City, N. J.		1.85@2.33
Kansas City, Mo.		1.92
Los Angeles, Calif.	.61†	2.44†
Louisville, Ky.	.54¼	
Memphis, Tenn.		2.60‡
Milwaukee, Wis.		2.25‡
Minneapolis, Minn.		2.32‡
Montreal, Que.		1.36
New Orleans, La.		2.20
New York, N. Y.		1.77@2.25‡
Norfolk, Va.		2.17
Oklahoma City, Okla.		2.46‡
Omaha, Neb.		2.36‡
Peoria, Ill.		2.27‡
Philadelphia, Penn.		1.85@2.41‡
Phoenix, Ariz.		2.91
Pittsburgh, Penn.		2.09‡
Portland, Colo.		2.80
Portland, Ore.		2.80
Reno, Nevada	.75¼	3.01
Richmond, Va.		2.25
Salt Lake City, Utah	.70¼	2.81
San Francisco, Calif.		2.31‡
Savannah, Ga.		2.50
St. Louis, Mo.	.55	2.20‡
St. Paul, Minn.		2.32‡
Seattle, Wash.	10c discount	2.65
Tampa, Fla.		2.25
Toledo, Ohio		2.20‡
Topeka, Kans.		2.41‡
Tulsa, Okla.		2.33‡
Wheeling, W. Va.		2.17
Winston-Salem, N. C.		2.78

NOTE—Add 40c per bbl. for bags.
†Delivered on job in any quantity, sacks extra.
‡Ten cents less to dealers.

Mill prices f.o.b. in carload lots, without bags, to contractors.

	Per Bag	Per Bbl.
Buffington, Ind.		1.85
Chattanooga, Tenn.		2.45*
Concrete, Wash.		2.35
Davenport, Calif.		2.05
Detroit, Mich.		2.15
Hannibal, Mo.		2.05
Hudson, N. Y.		2.05
Leeds, Ala.		1.95
Mildred, Kans.		2.35
Nazareth, Penn.		1.95
Northampton, Penn.		1.95
Richard City, Tenn.		2.05
Steelton, Minn.		1.90
Toledo, Ohio		2.20
Universal, Penn.		1.85

*Including sacks at 10c each.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agri-cultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	White Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	—Plaster Board— ¼x32x 36". Wt. 1500 lb. Per M Sq. Ft.	⅜x32x 36". Wt. 1850 lb. Per M Sq. Ft.	Wallboard, ⅜x32 or 48". Lgths 6'-10', 1850 lb. Per M Sq. Ft.
Arden, Nev. and Los Angeles, Calif.	3.00	8.00u	8.00u	10.70u	10.70u					11.70u			
Centerville, Iowa	3.00	10.00	15.00	10.00	10.00	10.50	13.50			13.50			
Detroit, Mich.‡				11.30	11.30	11.30		8.00					
Delawanna, N. J.						8.00		8.25@9.40			.14½s	.15½s	40.00@41.00
Douglas, Ariz.			7.00			15.50d	18.50		30.00	15.50			
Grand Rapids, Mich.	2.75	6.00	6.00	8.00	9.00	9.00	17.50		24.55	20.00			
Gypsum, Ohio‡	3.00	4.00	6.00	8.00	9.00	9.00	19.00	7.00	27.00	19.00		15.00	30.00
Los Angeles, Calif.			10.40k	11.40k									
Port Clinton, Ohio	3.00	4.00	6.00	10.00	9.00	9.00	21.00	7.00	30.15	20.00		20.00	30.00
Portland, Colo.				10.00									
San Francisco, Calif.					14.40r		15.40r						
Seattle, Wash.	6.50		11.00	16.00									
Sigurd, Utah									21.50				
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00					20.00	25.00	33.00

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable).
*To 3.00; †to 11.00; ‖to 12.00; ‡prices per net ton, sacks extra; (a) to 25.00; (b) net; (c) gross; (d) hair fibre; (i) delivered; (h) delivered in six states; (i) delivered on job; (k) sacks 12c extra, rebated; (m) includes paper bags; (o) includes jute sacks; (r) including sacks at 15c; (s) per board; (t) to 16.50; (u) includes sacks; (v) F.O B. N. Y. C. and dealers yard in mill locality.

New Machinery and Equipment

New 1¾ Yard Electric Power Shovel Uses Variable Voltage System of Operation

By R. W. McNeil, General Engineer
Westinghouse Electric and Manufacturing Co.

DUE to bad water conditions which seriously interfered with the operation of the steam power shovel previously used, the Standard Slag Co. of Steubenville, Ohio, have recently put into operation a new 1¾-yd. electric power shovel. The steam power shovel previously used was a Marion Steam Shovel Co., Model 37, of the full revolving type caterpillar mounted with 1¾-yd. dipper. The new shovel is of the same model and make, but is operated electrically by equipment furnished by the Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn.

Power is furnished to the new shovel at 2300 volts, 3 phase, 60 cycle from the plant of the Wheeling Steel Corp. Electrical equipment on the shovel is designed to use the variable voltage system of motor speed control. The electrical equipment is of Westinghouse manufacture and consists of a four-unit main motor-generator set, an exciter motor-generator set, three d.c. mill-type motors for operating the hoist swing and thrust motions of the shovel, together with starting equipment for the motor generator sets and controllers for the shovel motor.

General view of shovel containing new type of variable voltage motor control

The use of the variable voltage system on shovels of this size represents a distinct advance in the art of building small electric power shovels. Previously such shovels when electrically operated have been equipped with manually operated rheostatic control equipment which has been a constant source of trouble due to arcing, with consequent burning of controller contacts. With the variable voltage system as used on the Standard Slag Co.'s shovel practically no burning occurs on the controller contacts, as the currents in the controller are very small. Another advantage secured with the variable voltage system, using differential compound wound d.c. generators, is that these generators limit the current taken by the motors to certain definite maximum values even with motors stalled, so that with reasonable care in operation little trouble need be anticipated from any of the electrical equipment.

The main motor generator set consists of 75-hp., 2200 volt, 3 phase, 60 cycle induction motor, a 50-kw. differential compound wound d.c. hoist generator and two 16-kw. differential compound wound d.c. generators for operation of the swing and thrust motions.

The exciter set consists of a 7½-hp., 220 volt, 3 phase, 60 cycle induction motor driving a 5-kw. 125 volt compound wound generator. Transformers are provided on the shovel for reducing the 2200 volt line current to 220 volts for operation of the exciter MG set and a motor driven air compressor.

The hoist motor is of the d.c. mill type series wound and is rated 70 hp. 440 r.p.m. at 230 volts. The swing and thrust motors are duplicates; they also are of the d.c. mill type, but are equipped with shunt field windings and are rated 20 hp. 650 r.p.m. at 230 volts.

Both main and exciter MG sets are started as full line voltage, an oil circuit breaker

Closeup showing variable voltage motors and control

being used for the starting of the 75 hp. 2200 volt motor and a safety switch for the 7½ hp. 220 volt motor. Due to the use of the variable voltage system, the control equipment on this shovel for the operating motors is of the very simplest nature. With the variable voltage system speed control is obtained by variation of voltage of the d.c. generators used to furnish power to the individual motors. This voltage variation is secured by adjustment of field strength of a separately excited shunt field, which means that the currents to be handled by the controller are very small. Actually the motor control on the shovel consists of three small drum controllers together with separate field resistors. The swing and thrust controllers are of the reversing type and give complete control of the motors on these motions. The hoist controller is of the non-reversing type, as the shovel is designed to operate in accordance with steam shovel practice; that is, to use power for hoisting the dipper and in digging and to lower the dipper by gravity under control of a foot-brake. As the hoist motor is also used to propel the shovel a separate reversing switch is provided so that the motor can be reversed for this purpose. A compressed air operated clutch is provided on the hoist machinery to disengage the drum for lowering or when moving the shovel. Air brakes are provided on the hoist and thrust motors to prevent drifting. Both clutch and brakes are controlled from the controllers by magnetically operated air valves. Compressed air for operation of clutch and brakes is furnished by a 7½ cu. ft. motor-operated compressor.

This shovel has been extremely satisfactory in service and in the opinion of the operators is just as fast and powerful as the steam shovel it replaced.

New All-Steel Quarry Cars

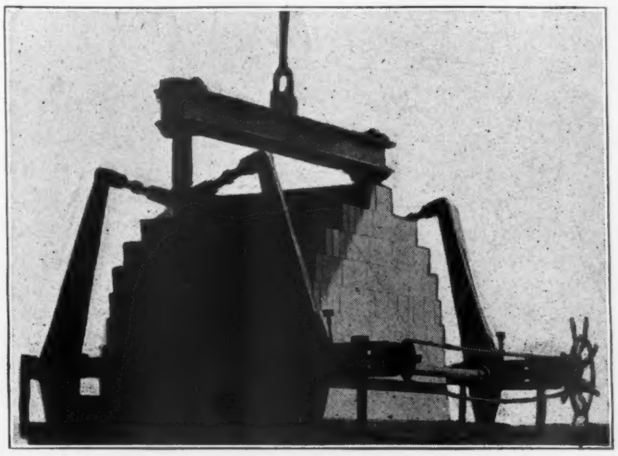
THE two illustrations herewith show one of the all-steel quarry cars especially built for the new limestone quarry and crushing plant of the Mathieson Alkali Works at Saltville, Va., by the Easton Car and Construction Co., Easton, Penn. They were designed by George W. Patnoe, quarry manager of the Mathieson Alkali Works.

The cars are of 7-yd. capacity, with the journal boxes on springs—an unusual refinement in quarry car design, but with Mr. Patnoe's long experience in quarry operation fully justified by him in saving derailments through uneven track. The car bodies also rest on spring plungers, so that the load may ride easier on the trucks and track. The bodies are all-steel but are lined, bottom and sides with wood planking to take the shock of steam-shovel loaded rock.

They are one-way dump, with lift sides, and the hinges and mechanism are made extremely rugged, as the views herewith show.

New Car Loader for Sand-Lime Brick

A DEVICE calculated to save time and labor in the loading of sand lime brick, etc., onto trucks, cars and other conveyances has recently been brought out by F. Komnick Co., Elbing, Germany. It is designed so that entire loads of piled brick on the cars from the hardening cylinders may be removed intact and lifted onto the transportation vehicles in one operation.



Entire pile of brick is carried intact into car by this device

The so-called "Gripper" is carried directly over the load and its bottom framework tightened about the lower tier of brick by turning a hand-wheel. The "Gripper" with its load is then raised and swung on to the vehicle which is to carry it away. The loader may be operated in conjunction with a derrick or an overhead crane, depending on the location of the car loading tracks.

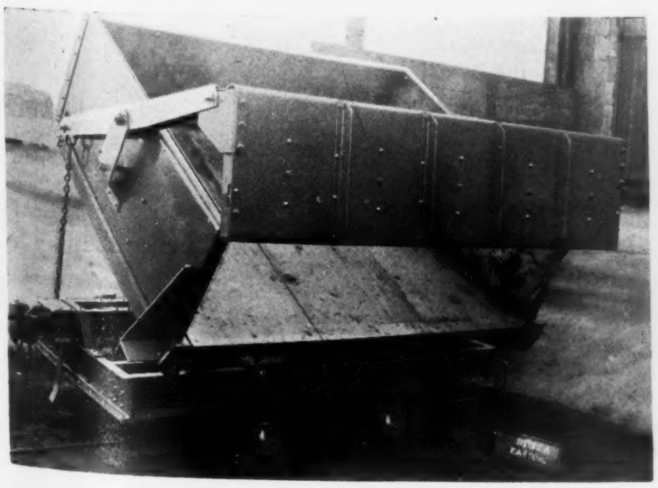
The raising of the load off the ground, although a continuous operation, is really in two stages. The first efforts of the hoist are expended in further tightening the bottom framework about the lower tier of brick. Lifting does not commence until the brick are pressed together sufficiently to act as a sort of carrying floor for the entire load. Thus when the loader is raised, there is no danger of the load slipping before being placed in the desired position.

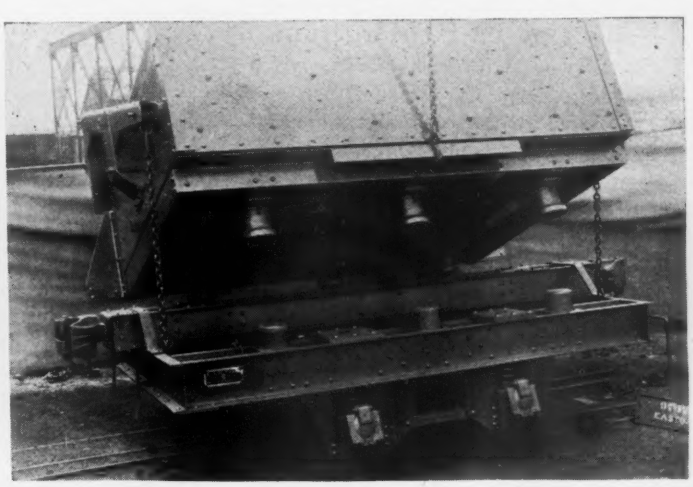
It is claimed that with this loader two men can place from 24,000 to 30,000 brick in cars or trucks in five hours.

World's Largest Dump-Truck Fleet Is in Sand and Gravel Industry

THE recent purchase of 12 additional Pierce-Arrow dual-valve trucks for the Norton-Keating Sand Co. of New York, an associate of the Colonial Sand and Stone Co., now gives these associated companies what is believed to be the largest fleet of Pierce-Arrow dump trucks in the world.

The addition of these trucks increases the Pierce-Arrow fleet owned by the Norton-Keating Sand Co. and the Colonial Sand and Stone Co. to a total of 93 dump trucks.





All-steel, 7-yd. quarry car. The car body rests on spring plungers and the journal boxes on springs

Yosemite Portland Places Machinery Order

ACCORDING to the Bakersfield (Calif.) *Californian*, the Yosemite Portland Cement Co., Merced, Calif., has awarded the contract for the machinery for the new cement plant to the Allis-Chalmers Mfg. Co., Milwaukee, Wis.

The contracts were made in San Francisco and, according to A. Emory Wishon, president of the company and vice-president and general manager of the San Joaquin Light and Power Corp., provide for delivery of the material in Merced in four and one-half months. The preliminary work at the mill site and at the quarries in Mariposa county is to be started at once so that the mill can be built without delay when the material arrives.

Included in the equipment are two kilns, 10 ft. in diameter and 240 ft. long. Two wet grinding mills, 7 ft. in diameter and 27 ft. long, and two clinker grinding mills of similar dimensions are also part of the order.

The mill is to have a capacity of 2500 bbl. daily, although this is 500 bbl. more than was decided on in the original plans. Provision for this increase had been left in these plans and the larger capacity was decided upon by the company's directors and engineers after a survey of general conditions in the valley had convinced them that building activities of every kind are on the upgrade and that there will be a decided demand for all the cement they can manufacture. They are hopeful of having the mill in production shortly after January, 1927.

The Yosemite company was organized a few years ago to build a mill at Merced, a tract for the mill purchased, and rights to large limestone deposits at Mariposa acquired. Financial difficulties held up the program and the company was reorganized with Emory Wishon as president, the new concern taking over all the properties.

Clinchfield Products Corporation Bought by H. P. Margerum

THE Clinchfield Products Corp., which produces North Carolina feldspar, has been purchased by Herbert P. Margerum, of Trenton, N. J., according to an announcement issued by the Golding Sons' Co.

The Clinchfield corporation began operations in Erwin, Tenn., in 1912. Mr. Margerum entered the feldspar business about three years ago, buying the holdings of the Goldin Sons' Co., who have been producing feldspar for more than 60 years. This company has mines in Maine, Connecticut, Maryland and North Carolina with grinding mills in Trenton, N. J., East Liverpool, Ohio, and Erwin, Tenn. He purchased the Clinchfield Products Corp. in July.

The New York offices of the Clinchfield corporation at 350 Madison avenue, will be maintained for a time and later be moved to the Trenton Trust Bldg., in Trenton, the headquarters of the Golding Sons' Co.

The laboratory facilities of the combined companies are now being increased and will be at the disposal of users of feldspar, clay, flints and Cornwall stone.

Claims Sand Dredging Interferes with City Water Supply

THE Wichita Water Co., Wichita, Kans., has asked Gov. Paulen to restrain the Consumers Sand Co. from further dredging sand from the bed of the Askansas river. It is claimed that the city of Wichita's water supply is in danger because of this practice and the sand company is violating an order issued by the state executive council on June 1, 1922.

There are three strata of land under the bed of the Arkansas river and immediately adjacent to it, which figure in the controversy over sand dredging. The upper layer, from 10 to 12 ft. deep, consists of sand, and contains surface water, unfit for drinking. Next comes a layer of clay of from 12 to 30 in. and below this is the water bearing gravel, into which the city's wells are drilled. When the sand is pumped away the underflow is diverted into the river, the level of the underground stream is lowered and the supply becomes decreased, it is said. — *Wichita (Kans.) Beacon.*

Atlas Company to Take Over Rock Asphalt Mines

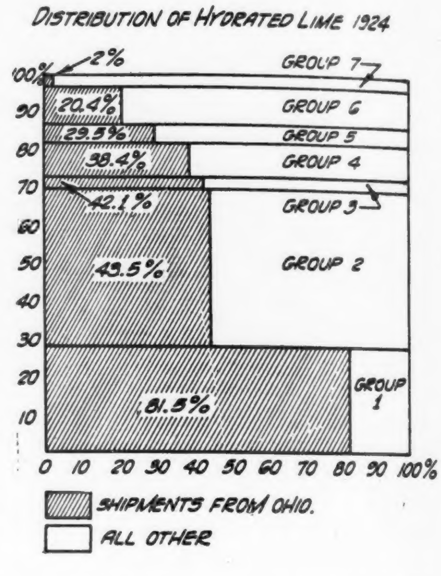
THE Atlas Rock and Asphalt Co., incorporated at $500,000, has been organized at Russellville, Ky., to take over the old Mason mines and other leases located about four miles northeast of Russellville on the Russellville-Morgantown road. Preferred stock in the company totals $500,000, it is said, while the 15,000 shares of common stock have no par value. Machinery costing $40,000 has been ordered and will be installed within a short time, according to officers of the company.

The corporation will employ approximately 100 men to start and it is planned to quarry 1,000 tons of rock asphalt a day. Plans call for a siding over a roadbed used by the old asphalt mines, connecting with the Memphis division of the Louisville & Nashville about one and a half miles due east of Russellville. Main offices of the corporation will be in Russellville under the name of the Atlas Rock and Asphalt Co., Inc., and operations will begin at once, it is said.

Peter B. Young, St. Joseph, Mo., who has been a road contractor for a number of years, is president of the corporation, and others connected with it are J. M. Buckner, St. Louis, Mo., formerly of Louisville; John S. Jones, Chicago broker, and E. W. Houston, owner of the Green Taxi Cab Co., of Pittsburgh.—*Louisville (Ky.) Courier Journal.*

Hydrated Lime in 1924

PRODUCERS of hydrated lime shipped into the various states of continental United States 1,312,019 tons of hydrated lime during 1924, according to reports made to the Bureau of Mines, Department of Commerce. Of this amount, 652,731 tons, or one-half, was produced in Ohio. Since so large a part of the total shipments came



from Ohio plants, it is of interest to compare the distribution of the Ohio product with that of the United States as a whole. Publication of comparative figures of shipments into individual states is not, however, permissible, as it would tend to disclose items relating to distribution by individuals. The figures below are therefore presented for seven blocks of contiguous states which roughly comprise various freight-rate groups:

State group[1]	From all plants. Short tons	From all plants. Per cent distribution	From Ohio plants. Short tons	From Ohio plants. Per cent distribution	Per cent of total to group
1	377,979	28.81	308,052	47.19	81.50
2	539,702	41.14	234,632	35.95	43.47
3	35,836	2.73	15,073	2.31	42.06
4	125,814	9.59	48,328	7.40	38.41
5	65,141	4.96	19,225	2.95	29.51
6	130,631	9.96	26,664	4.08	20.41
7	36,916	2.81	757	.12	2.05
	1,312,019	100.00	652,731	100.00	49.75

[1]1. Ill., Ind., Mich., Ohio.
2. Del., Dist. of Col., Md., N. J., N. Y., Pa., W. Va.
3. Conn., Me., Mass., N. H., R. I., Vt.
4. Fla., Ga., N. C., S. C., Va.
5. Ala., Ky., La., Miss., Tenn.
6. Ark., Ia., Kans., Minn., Mo., Nebr., Okla., Tex., Wis.
7. Ariz., Calif., Col., Idaho, Mont., Nev., N. Mex., N. Dak., Oreg., S. Dak., Utah, Wash., Wyo.

Outings of Slate Men

THE annual outing of the Pennsylvania slate quarries was held at the Chapman Quarry's Boy Scout camp on August 4. An opportunity was given to visit the various quarries on the previous day. A clambake was one of the big features of the event.

The New York-Vermont group will have a similar outing September 4 at Lake Bomoseen, Vermont.

News of All the Industry

Incorporations

Grand Rapids Gypsum Co., Grand Rapids, Mich., have increased capital from $75,000 to $100,000.

Keystone Cement Products Co., Monaca, Penn., $35,000. H. S. Malone.

Farragut Marble Co., Knoxville, Tenn. Increased capital from $300,000 to $500,000.

Monessen Sand and Gravel Co., Monesson, Penn., $25,000. J. J. Kilroy and others.

E. T. Durden Sand Co., Salisbury, Tenn., $10,000. E. T. Durden and R. T. Freeman.

National Rock Co., Kansas City, Mo., $50,000. E. A. Bunton, 3925 Genessee St., Kansas City.

Niagara Sand Corp., Buffalo, N. Y. Decreased capital from $200,000 to $138,000.

Londino Stone Co., New York, N. Y., $50,000. S. and M. Londino, S. Lombardi. To manufacture artificial stone.

Dakota Sand and Gravel Co., Washburn, N. D., $12,000. H. A. and B. Brocopp and M. D. Avery, all of Bismarck, N. D.

Monon Stone Co., Bloomington, Ind., 5,000 shares of no par value. F. T. Brodix, G. W. Henley, D. A. Ivins and others.

Brass City Sand and Gravel Co., Waterbury, Conn., $50,000. M. J. Brady, 38 Washington St., and others, all of Waterbury.

United Sand and Gravel Corp., Trenton, N. J., 750 shares of no par value. M. H. and I. Hausman, F. V. Sigler and M. A. Kraemer.

Portland Stone Co., Inc., Portland, Ore., $5,000. A. M. Mayer, J. B. Bouchard, Edwin Calkins and J. R. Murphy.

Dixie Talc Corp., Atlanta, Ga., $15,000. F. M. and T. L. Boston, 106 Peachtree Place, Atlanta. To operate talc deposits near Atlanta.

Atlantic Gypsum Products Co., Portsmouth, N. H., 50,000 shares of $100 par and 200,000 shares common of no par value.

Winchester Gravel and Stone Co., Winchester, Ind., $40,000. A. E. Fudge, Everett Clark and A. H. Burke.

George L. Rutledge Co., Portland, Ore., $6,000. George L. Rutledge, G. H. Rutledge and George W. Bates. To engage in the sand and gravel business.

Graystone Concrete Products Co., Tacoma, Wash., $20,000. E. B. Ballinger, W. F. Paddock and others. To engage in the manufacture of cement products.

Hardstone Brick Co., Little Falls, Minn., $225,000. J. C. Kinderwater, 774 E. 5th St., St. Paul, Minn., and others. To manufacture cement brick, tile and other cement products.

Indianapolis Concrete Products Co., Indianapolis, Ind., $100,000. E. F. and R. T. Smith, G. R. Harr. To manufacture and deal in cement products.

Silicate Products Corp., Camden, N. J., 2500 shares of no par value. G. E. Dale, G. K. Preston and W. B. Benjamin. (Filed by New Jersey Guarantee and Trust Co., Camden.)

Revelex Corp., Chicago, Ill., $20,000 and 300 shares of no par value. J. M. Larimer, G. H. Grear and W. E. Dever. Corr.: McKinney, Lynde and Grear, 105 S. La Salle St., Chicago. To manufacture and deal in concrete products, etc.

Quarries

Macken Granite Co., Sparta, Ga., has resumed operations after the recent fire which caused considerable damage to the power plant. New electric equipment has been installed. The Macken company is busy filling orders for crushed stone and curbing contracted for by various Florida cities.

Weldon Springs Quarry Co., Weldon Springs, Mo., is enjoying a busy season. The company is working overtime to fill large orders for crushed stone for a highway project and ballast for the M. K. and T. railroad.

N. Pelaggi & Co.'s main plant and other structures at Northfield, Vt., were damaged by a recent fire with an estimated loss of about $200,000.

Milwaukee, Wis. The municipal quarry at Airport park is expected to double its output by the operation of a larger crusher. The city is said to pay about 10 cents per cu. yd. for stone at the quarry.

Florida Rock Products Co. has moved its main offices from Tampa to Brooksville, Fla., where the quarry and plant are located.

William Fister has obtained a lease of the county rock quarry located at Viley Station, Ky., from the county highway committee. The lease, which is for 3 years, provides that Mr. Fister shall furnish crushed rock for the county at 80 cents a ton and screened material at $1 per ton. The county is to be allowed a 20-cent per ton royalty on all other rock sold.

Bell Columbia Marble Co., Columbia, Calif., is now operating two shifts at their plant to get out the 6,000 tons of crushed rock recently contracted for by county highway officials.

Sand and Gravel

Oliver King Sand and Lime Co., Knoxville, Tenn., has recently completed a new screening plant at a cost of $6500.

Twin River Gravel Co., Black Rock, Ark., is now in operation after installing new machinery.

Arundel Corp., Baltimore, Md., has been awarded contract by the U. S. War Department for dredging the main channel and jetties near Miami, Fla. The cost of the work is estimated to be about $2,300,000.

J. F. Paddeford has purchased a deposit of sand and gravel near Sherburne, N. Y., and has started the erection of a washing and screening plant on the property. Work is already under way for a switch track to connect the deposit and plant with the main line of the Utica division of the Lackawanna railroad.

H. W. Thaten is planning to open a sand and gravel plant near Childress, Tex. Modern equipment for washing and screening gravel will be installed. The railroad and the neighboring towns are expected to be the chief consumers.

Superior Sand and Gravel Co., Seattle, Wash., has been adding about $2500 worth of electrical equipment.

Crescent Sand and Gravel Co., Yakima, Wash., has been adding about $7000 worth of new machinery to its equipment.

McGeorge Gravel Co., Mansfield, Ore., will soon begin erection of an addition to its docks, to cost about $15,000.

Cement

Great Lakes Portland Cement Corp., Buffalo, N. Y., has taken out a permit to construct a power substation and electric shop at its new mill now in course of construction.

Sun Portland Cement Co., Lime, Ore., was forced to close temporarily for a few days in July because of the extreme water shortage in that section. A new agreement was made with city water officials which provides for a 5-in. flow of water from Burnt river. At the same time an option was taken for a 15-in. flow in case the company finds that it needs this additional water. With this agreement it is now felt that the water question is definitely settled and that henceforth production at this plant will go forward on a large scale uninterrupted.

Gypsum

United States Gypsum Co. has completed its chain of Pacific Coast distributing points by locating one in San Francisco and one in Oakland, Cal. Others had been located at San Diego and Los Angeles, Cal., Seattle, Wash., and Portland, Ore.

Cement Products

Cement Products Co., Statesville, N. C., has recently begun the manufacture of building tile, ornamental cement products, etc. W. S. Chappell owns and operates the plant.

Graystone Concrete Products Co. has purchased the business of the Harrison Concrete Products Co., in Tacoma, Wash.

Hardstone Brick and Engineering Co., South Park, Minn., has begun production in its new $240,000 plant. The principal products made are concrete brick and tile.

Pyramid Block Co., West Allis, Wisc., has added a new automatic block-making machine which is expected to increase the plant capacity to about 2,000 block per day.

Reimers-Kauffman Co., Lincoln, Neb., are planning the erection of a new cement products plant to cost about $5,000 without equipment. The company will abandon their present plant and move to the new one on its completion.

American Cement and Tile Co., Wampum, Penn., lost a portion of its main plant through fire recently. The fire started in the adjoining plant of the Lastik Products Co. and spread to the cement products plant. Frequent explosions of drums of naphtha in the Lastik company's plant made the fire difficult to fight.

Silica Sand

Canadian Glass Products, Ltd., has purchased the building formerly occupied by the Lion Mead Rubber Co. at Wrightville Hill, Quebec, Canada, and will establish a sand pulverizing plant at a cost of approximately $100,000.

Rock Phosphate

American Agricultural Chemical Co., New York, is planning to expend about $100,000 to further develop its Florida rock phosphate deposits. A new mine will be opened, a washing plant erected and a railroad extension laid from the main plant at Pierce.

Miscellaneous Rock Products

American Potash and Chemical Corp., Woolworth Building, New York, has been recently incorporated under Delaware laws with a capital of 1,000,000 shares of stock, no par value, to take over the American Trona Corp. and other organizations. It is planned to operate and expand plant facilities for the production of potash and affiliated specialties. L. A. G. Dru and H. S. Emlaw head the new company.

Charles Stenicka, Omaha, Neb., is planning to open a plant for the manufacture of artificial marble. Patents covering the manufacture of the product from limestone, cement and marble dust have been issued to Mr. Stenicka, it is said.

Personal

S. A. Perkins, principal owner of the Standard Gypsum Co., Seattle, Wash., and noted publisher of the state of Washington, was a passenger aboard the liner H. F. Alexander, which arrived at San Pedro, Calif., recently from Seattle and San Francisco. He is in Southern California to inspect the company's plant at Long Beach harbor. The Standard Gypsum Co. operates the steamer "S. A. Perkins" between this port and the quarries on San Marcos Island, Lower California.

Edwin Tomlin, Victoria, B. C., secretary-treasurer of the British Columbia Cement Co., Ltd., was elected chairman of the British Columbia division of the Canadian Manufacturers' Association at the recent annual meeting of that body.

W. S. Hays, secretary of the National Slate Association, Philadelphia, Penn., was a speaker at the recent annual convention of the National Industrial Advertisers' Association. Stressing the large sums of money involved in co-operative advertising and estimated at millions, Secretary Hays outlined the effective results accomplished by these industries and firms involved in group advertising. He went over the ground covered by 47 associations and their records, enumerating the problems revealed in the experiences of those associations in order that the members might profit by practical conditions that had to be met in the course of the campaigns. In a survey of the last decade, he gave an account of 33 campaigns that had been successfully conducted through sound plans, good advertising, proper administration, ample finances and a long enough period of duration to register profitable results.

N. S. Greensfelder, advertising manager of the Hercules Powder Co., Wilmington, Del., and editor of the "Explosives Engineer," has been elected a vice-president of the National Indus-

Kilns-not coal eaters

The "Arnold" Kiln achieves the high peak of economy in modern lime burning practice. It is designed, built—and installed—in accord with full knowledge of the present needs of the lime industry. Here in Woodville we are in constant intimate contact with the industry's problems. We know that reduction of the cost of producing lime is every lime man's desire. And we know that we are filling the bill. Kilns—not coal—eaters!

ARNOLD & WEIGEL
WOODVILLE, OHIO, U.S.A.

trial Advertisers Association. Mr. Greensfelder is a director of the National Crushed Stone Association.

Howard H. Pifer has resigned his position as superintendent of the Erie stone quarry, near Bluffton, Ind. He will not announce his future work for a month or more, as he intends taking a much needed rest before engaging in new work. He was made superintendent seven years ago. Orville Paxson, an employe of the company, has been advanced to the job of superintendent. The stone quarry is one of the community's substantial industries.

K. M. Wright has been promoted to acting superintendent of the Genoa lime plant of the United States Gypsum Co., Genoa, Ohio, succeeding Mr. Davis, who has been transferred to the plant at Gypsum, Ohio.

G. G. Hanson, of 2642 North Mozart St., Chicago, Ill., has been appointed western representative of the Golding Sons' Co., and the Erwin Feldspar Co., Inc., and will represent these two companies in the sale of feldspar, kaolin, ball clays, sagger clays and cornwall stone in the states of Missouri, Kentucky, Illinois, Michigan and Wisconsin.

Don S. Brisbin, manager of sales of the Columbus McKinnon Chain Co., Columbus, Ohio, has been elected president of the American Supply and Machinery Manufacturers' Association. He is also a director of the Automobile Equipment Association and is widely and favorably known to the automotive and hardware fields through his constructive work in both industries and his authoritative addresses before various national conventions and assemblies.

Robert W. Gillispie has been elected vice president, assistant general manager and to the board of directors of the Jeffrey Mfg. Co., Columbus, Ohio. Mr. Gillispie has for many years been identified with the executive sales work of the Bethlehem Steel Co. He was graduated from Wesleyan University, Conn., in the class of 1904, with Phi Beta Kappa rank.

O. L. Moore, formerly engineer, inspection bureau, Universal Portland Cement Co., has been appointed to the position of engineer of tests in that company, according to an announcement from the Chicago office of the Universal company. Mr. Moore is a graduate of Carnegie Institute of Technology and a member of the American Society for Testing Materials, American Concrete Institute and Western Society of Engineers. He has been connected with the Universal Portland Cement Co. for the last 12 years.

H. D. Randall has been made sales manager of the gear section of the industrial department of the General Electric Co., with headquarters at the River Works, West Lynn, Mass.

C. W. Fisher, for two years associated with the McMyler-Interstate Co. in the sales engineering department at Cleveland, has just been named to head the Chicago branch of the firm.

Ernest Wooler, chief engineer of the Timken Roller Bearing Co., Canton, Ohio, sailed for England on July 14 on the S.S. Berengaria. During his stay he plans to investigate the development of anti-friction bearings in all industries, including automotive, industrial and transportation and visit the British Timken plant at Common Lane, Ward End, Birmingham.

L. G. Love has been appointed sales manager of the National Lime and Stone Co., Cary, Ohio. Mr. Love was formerly with the Crescent Cement Co. and with other companies at Denver, Colo.

T. E. Doremus, at present manager of the Seattle, Wash., office of the explosives department of E. I. du Pont de Nemours & Co., has been appointed manager of the New York office of the explosives department, succeeding the late Frederick C. Peters.

Hugh Haddow, Jr., president of National Sand and Gravel Association, suffered considerable damage to his home at Dover, N. J., through the recent arsenal explosion at Lake Denmark, N. J., about 5 miles from Dover. The house was considerably shaken and every window shattered by the terrific blast.

A. E. Coates has been elected vice-president of the Coates Steel Products Co., Greenville, Ohio, and will represent the company in the eastern states, making his headquarters at Upper Darby, Penn. Mr. Coates was formerly assistant manager of the York Engineering and Manufacturing Co., New Orleans, La.

J. V. N. Dorr, president of the Dorr Co., New York, sailed recently for Europe on the S.S. Homeric.

Ivan S. Forde, formerly manager of the small turbine division of the Westinghouse Electric and Manufacturing Co., and for the past three years manager of the sales promotion department of the Diamond Power Specialty Corp., has resigned to become affiliated with the Furnace Engineering Co., manufacturer of the "Simplex" unit pulverizer, as sales manager, with headquarters at 5 Beekman St., New York City.

J. H. Smedley, formerly controller of the Great Western Portland Cement Co., has been appointed chief city accountant for Kansas City, Mo.

J. A. McIlwee, president of the Idaho Phosphate Co., Paris, Idaho, will sail shortly for Europe on a combined business and pleasure trip.

Obituary

J. Oscar Johnson, former manager of the Moline Consumers' Gravel Co., Moline, Ill., died recently at his home in Ottawa. Mr. Johnson was 52 years old and was born in Moline. He came to Ottawa five years ago, and since coming to this city had made a wide acquaintance of friends. For twenty-seven years he was employed by the Moline Consumers' company and four years ago he was named as manager of the Ottawa branch, which is located four miles west of the city. One year ago he gave up his executive office and became a traveling salesman for the concern.

Archibald A. Young, former secretary-treasurer of the Bedford Stone and Construction Co., retired business man and active for many years in republican county and state politics, died recently at his home in Indianapolis, Ind. He was one of the organizers of the Bedford Stone and Construction Co. He served as collector of customs for Indiana, was a member of the city council for two years, and a republican county chairman.

C. D. Hale, a member of the engineering staff of the structural bureau at the general office of the Portland Cement Association, Chicago, died on July 24, 1926, after a lingering illness brought on by a combined attack of influenza and pneumonia. Mr. Hale was a graduate in civil engineering from Northwestern University, Evanston, Ill. He is survived by his wife and baby daughter. He was buried at Princeville, Ill.

M. J. Higgins, traffic manager of the Kansas Portland Cement Co., died recently at his father's home in Toledo, Ohio. Mr. Higgins is survived by his father and a sister in Toledo.

W. A. Roebling, president of the John Roebling's Sons Co., Trenton, N. J., died on July 21 at his home in Trenton. Mr. Roebling was a prominent engineer and best known as the builder of the Brooklyn bridge.